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USE OF WHEAT FOR FEED IN THE EUROPEAN ECONOMIC COMMUNITY

WITH PROJECTIONS TO 1975

ECONOMIC RESEARCH SERVICE

U.S. DEPARTMENT OF AGRICULTURE

ABSTRACT

Agricultural policies pursued by the European Economic Community (EEC) have resulted in significant surpluses of soft wheat. Although some wheat is fed directly on farms, a large tonnage must be exported or denatured for feed at a high cost. The EEC's wheat-denaturing regulations evolved through a phase of extreme caution to one of generous subsidization. Little information is available on farmer attitudes concerning the use of wheat for feed. Further adjustments in the EEC's wheat/coarse grain price ratio to better reflect relative feed values are expected. Use of wheat for feed in the EEC is projected to range from 9.5 to 11 million metric tons in 1975. Such usage could displace from 8.5 to 14.5 million metric tons of feed grains, depending on which feed grain is selected.

Key Words: European Economic Community, grain-denaturing regulations, wheat feed grain, feed grain, projections.

FOREWORD

This report discusses the European Economic Community's (EEC) use of wheat for feed. Topics included in the discussion are the EEC's grain-denaturing regulations, factors affecting the use of wheat for feed, the impact of wheat on feed grain requirements, and projections to 1975.

This report will be useful to U.S. Government officials and other persons concerned with international trade, particularly grain exports. The report will also be of interest to educators and researchers who have a general interest in the agricultural policies of the EEC.

The author is grateful to Prof. Sidney Ishee, University of Maryland, for his guidance in the development and completion of this report. Materials submitted to the U.S. Department of Agriculture in Washington, D.C., by U.S. Agricultural Attaches throughout the EEC countries were also very helpful. This is particularly true of the information provided by Ernest Koenig, U.S. Agricultural Attache to the EEC in Brussels, Belgium.

Washington, D.C. 20250 August 1971

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SUMMARY

Projections indicate that the European Economic Community will use 9.5-11 million metric tons of wheat for feed in 1975, of which nearly 90 percent will probably be consumed in France and West Germany. Feed grain imports will necessarily be displaced by the amount of wheat expected to be used for feed. Based on the relative feeding values of grains as developed in West Germany for hogs and dairy cows, the displacement would range between 8.6 and 14.5 million tons depending on which feed grain is selected.

A policy of high support prices for grains, combined with prices favorable to wheat within the price-supporting system, led to surplus soft wheat production in the Community. The growing surplus of soft wheat caused higher export and denaturing costs for the EEC's Agricultural Guidance and Guarantee Fund. Concern about the level of farm income and the rising costs of a number of other surplus commodities prompted the Community to move feed grain prices more in line with wheat prices.

The Community's wheat/feed grain price ratios during the period of analysis (1955/56-1966/67) did not reflect relative feeding values. This failure was highlighted more by West Germany feeding experiments than by U.S. experiments, especially as regards the relative feeding value of corn and wheat. The West German feeding experiments for hogs and cattle indicated that wheat prices should be below corn prices to properly reflect relative feeding values. If the results of the West German experiments become widely accepted, it will be more difficult for the Community to move wheat into feed use than if judgments are based on U.S. experiments.

Community regulations pertaining to the denaturing of wheat evolved from a phase of extreme caution to one of generous subsidization. High denaturing premiums will continue in the Community if domestic surpluses of soft wheat persist, if world wheat supplies remain abundant, and if wheat/coarse grain price ratios are not further adjusted. However, further adjustments in wheat/coarse grain price ratios to better reflect relative feeding values are expected.

Use of Wheat for Feed in the European Economic Community With Projections to 1975

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INTRODUCTION

The European Economic Community (EEC) 1/ is the major market for U.S. grain exports. Between marketing years 1957/58-1959/60 to 1965/66-1967/68, U.S. grain shipments 2/ to the member nations of the EEC increased from an annual average of 4.8 to 9.7 million metric tons (table 1). The peak year was 1965/66 when U.S. grain exports to the EEC totaled nearly 12 million metric tons. Expansion in grain production in the EEC caused U.S. grain exports to that area to decline to 6.8 million tons in 1968/69. Nevertheless, since 1957/58 grain shipments to the EEC have accounted annually for slightly less than one-third to one-half of the total volume of U.S. commercial grain exports (appendix table 1).

Community members have consistently accounted for a larger proportion of U.S. feed grain export tonnage than for wheat exports. This is true of commercial shipments as well as combined concessional and commercial shipments. Generally, less than one-tenth of all U.S. exports of wheat and flour have gone to the EEC, compared with about two-fifths of the feed grains (appendix table 1).

1/ The European Economic Community, variously referred to as the EEC, European Community, EC, Community, Common Market, and so forth, was established in 1958 by the "Rome Treaty." Full members include West Germany, France, Italy, Netherlands, Belgium, and Luxembourg. Associate members--excluded from discussion in this report--are Greece and Turkey.

2/ Excluding rice and rye and all grain products except flour. Unless otherwise indicated, the metric system of weights and measures are used in this report.

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Table 1.--Quantity and value of U.S. grain exports to the EEC, 1957/58-1968/69

Year	Quantity of U.S. grain exports			Value of U.S. grain exports		
	Total 1/	Wheat 2/	Feed grains 3/	Total 1/	Wheat 2/	Feed grains 3/
	1,000 metric tons			1,000 dollars		
1957/58	3,414	945	2,469	170,841	57,342	113,499
1958/59	5,373	1,067	4,306	289,317	74,248	215,069
1959/60	5,648	851	4,797	289,012	60,222	228,790
1957/58 1959/60 Av.	4,812	954	3,857	249,723	63,937	185,786
1960/61	6,192	2,021	4,171	330,213	133,670	196,543
1961/62	7,357	1,840	5,517	403,188	131,598	271,590
1962/63	6,310	674	5,636	323,313	48,989	274,324
1963/64	6,719	1,474	5,245	377,095	98,934	278,161
1964/65	7,787	635	7,152	418,298	40,557	377,741
1965/66	11,944	1,766	10,178	643,439	105,423	538,016
1966/67	8,131	1,506	6,625	467,678	99,131	368,547
1967/68	9,039	1,320	7,719	479,547	87,854	391,693
1965/66 1967/68 Av.	9,705	1,531	8,174	530,221	97,469	432,752
1968/69	6,811	1,316	5,495	354,941	86,001	268,940

1/ Excludes rice, rye, and all grain products except wheat flour.
2/ Includes wheat flour.
3/ Includes barley, oats, corn, and grain sorghum.

Source: Appendix tables 1 and 2.

Grain sales to the EEC are on a cash basis constituting an important source of foreign exchange earnings for the United States. In 1965/66-1967/68, U.S. grain exports to the Common Market annually averaged $530 million, more than double the average for 1957/58-1959/60 (table 1). Over 80 percent of this recent export value of grains was feed grains. In fact, U.S. feed grain exports to the Community in the 1965/66-1967/68 period accounted for nearly three-tenths of total U.S. agricultural exports to that area and for nearly one-tenth of all commercial agricultural exports (appendix table 2). However, the value of U.S. grain exports to the EEC in 1968/69 declined to $355 million, the lowest level since 1962/63.

Disequilibrium in Grain Production and Use

Rising disposable income in the EEC has resulted in an increase in demand for animal products and stimulated a sharp expansion in domestic livestock and poultry production since the early 1960's. Because expansion in domestic feed grain production was not sufficient to meet rising utilization, feed grain imports increased. At the same time, Community production of soft wheat increased even though there was little change in the domestic use of wheat for food. This resulted in excess supplies of soft wheat under existing support prices at a time when import requirements of feed grains continued to mount (table 2). Increased imports were, however, confined to corn and sorghum.

The increase in EEC wheat exports provided more dramatic evidence of the developing surplus than indicated in net trade figures. In 1964/65 and 1965/66, exports to nonmember countries reached 5.7 and 5.8 million metric tons, respectively. Previously, annual exports to nonmember countries had not exceeded 3.8 million tons. Soft wheat exported by the Common Market may be considered surplus since the partially offsetting imports are hard or durum wheat. Imports from third countries in recent years have been around 4.2 million tons. Practically all of this was high-quality wheat.

Price supports for wheat by individual member countries, either prior to or within the context of the common agricultural policy (CAP) 3/, have been at levels above relative feeding values and generally above world market prices. Consequently, natural market forces have not operated to clear the market of existing supplies. Rather, subsidies were provided to move excess production into world markets or into feed use. These subsidy costs for wheat are causing serious concern in the European Economic Community 4/.

Alternatives to Achieving Equilibrium

A number of options could be listed which the EEC might choose to lessen its disequilibrium in the wheat/feed grain sector. However, assuming that the variable levy system currently in operation in the EEC will go unaltered to any substantial degree, the two major alternatives appear to be:

(1) substituting feed grains for wheat production, or
(2) increasing the amount of wheat used as feed.

Wheat and feed grain production might be altered through acreage allotments, other quantitative controls, or shifts in production through price incentives (such as a change in the wheat/feed grain producer price ratio). Policies pursued by the EEC do not favor production controls 5/.

3/ CAP refers to the EEC's policy of adapting individual member country agricultural programs for production, marketing, and trade to a program essentially uniform for the whole area. The major feature of the CAP is its system of minimum import prices with variable import levies and export subsidies.

4/ Dairy products, sugar, and some fruits and vegetables are other commodities causing surplus disposal problems.

5/ Individual country production quotas, however, have been established for sugar. Quotas are at very liberal levels and surpluses continue.

Table 2.--Net trade in selected grains by the EEC, 1955/56-1967/68 1/

Year	Wheat	Feed grains				
		Total 2/	Oats	Corn	Barley	Other grains 2/
	1,000 metric tons					
1955/56	-2,228	-5,865	-448	-1,990	-2,668	-759
1956/57	-5,695	-5,256	-713	-2,322	-1,603	-618
1957/58	-747	-6,117	-655	-2,609	-2,221	-632
1958/59	-2,047	-7,494	-690	-3,135	-2,578	-1,091
1959/60	-1,091	-8,678	-850	-4,217	-2,123	-1,488
1960/61	-4,089	-6,365	-663	-3,769	-679	-1,254
1961/62	-3,547	-9,205	-842	-5,593	-1,320	-1,450
1962/63	+308	-9,145	-738	-6,090	-1,036	-1,281
1963/64	-317	-8,801	-404	-7,422	+430	-1,405
1964/65	+2,121	-9,209	-526	-7,624	+457	-1,516
1965/66	+1,593	-12,300	-848	-8,819	-1,034	-1,599
1966/67	+199	-11,855	-553	-9,112	-664	-1,526
1967/68	+1,302	-10,244	-559	-9,529	-185	-1,075

Note: Minus (-) signifies net imports and plus (+) net exports.

1/ Intra-EEC trade excluded. 2/ Rye and rice not included.

Source: Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 1, 1968, and No. 1, 1969.

The high price level for wheat existing in some member countries of the EEC prior to its formation forced a grain price agreement with wheat prices substantially above feed grain prices. This gap was subsequently narrowed and may be narrowed further by increasing feed grain prices while holding wheat prices relatively constant.

Wheat used for feed could be increased by adjusting wheat/feed grain price ratios to reflect relative feeding values 6/. Target and intervention price ratios could be set to achieve this objective or denaturing premiums (subsidies) could be adjusted to further reduce the price of wheat relative to that of feed grains. Some EEC members have adjusted denaturing premiums from time to time and the Community's policy of denaturing wheat has evolved through a multitude of regulations. As stated earlier, wheat-feed grain price relationships agreed to in December 1964 have been adjusted to more nearly reflect relative feeding values. The Community's whole spectrum of grain prices are at sufficiently high levels to promote inefficient production and to modify comparative advantage.

6/ Presumably, wheat/feed grain price adjustments which would encourage producers to shift into feed grain production would also tend to promote the substitution of wheat for feed grains in livestock rations.

Objectives

The general objective of this study is to isolate and measure the impact of factors that affect the use of domestically produced wheat for feed in the European Economic Community. If wheat surpluses continue to increase in the EEC and wheat is substituted for feed grains, the EEC's feed grain import requirements will change substantially.

Specifically, the objectives of this study are to:

(1) Outline the evolution of Community grain regulations, particularly those pertaining to the denaturing of wheat.

(2) Organize data relevant to the disposition of feed wheat, its feeding value, and attitudes on feed use.

(3) Derive estimates for the components of the demand relationship pertaining to the demand for wheat as feed.

(4) Determine and assess adjustments in economic forces and other conditions which would lead to increased use of wheat for feed in the EEC.

(5) Project the use of wheat for feed to 1975 and to assess its impact on feed grain imports.

Review of Literature

An earlier economic analysis closely related to this study is Vigen's work on the future demand for wheat in the European Economic Community (83). Vigen hypothesized that wheat utilized as feed was a function of five variables: the price of wheat received by farmers, poultry meat production, egg production, total grain produced (excluding wheat), and a trend factor. With one exception, coefficients relating to the first four variables were not significant (in France the coefficient of "total grains produced" was significant). West Germany was the only member country where the regression coefficient for the trend factor differed significantly from zero. Vigen pointed out that the high degree of intercorrelation within the explanatory variables leaves the reliability of the individual coefficients in doubt. However, he indicated that this does not deter use of the equation for predictive purposes.

Diverse opinions exist on the future level of wheat likely to be used for feed in the EEC. Vigen projected absolute increases in feed use of wheat in all member countries through 1970 and 1975. Sorenson and Hathaway expected increased Community production of soft wheat through 1970 and 1975, but concluded, especially for France, that the quantities of wheat which would be exported or fed were "impossible to project, inasmuch as this will depend upon a host of political and economic factors both within and outside the EEC (73, p. 111)." These same two authors concluded, however, that barring a sudden surge in the world grain market, it was likely that most of the EEC's surplus food grains would be diverted to feed use.

Analysis by the EEC Commission in 1963 projected a 75-percent increase in use of wheat for feed between 1958 and 1970 7/ for the whole of the EEC (21). In a 1966 revision of these projections, the Commission compared the interpolated data for 1962 with actual developments for this period and found the use of wheat for feed to be nearly 1 million tons or 16 percent below expectations (20). As a result, 1970 projections of the amount of wheat used for feed was revised downward to 7.2 million metric tons, but remained 55 percent above 1958 use.

Detailed country studies on long-term developments of demand and supply for agricultural products also concluded that larger quantities of wheat will be used for feed in West Germany and France. Researchers at the Institut fur Wirtschaftsforschung (IFO) concluded for West Germany:

> ...it is probable that the percentage of wheat fed will increase considerably during the projected period. In the base period [average of 1960/61-1962/63] 37 percent of wheat production was used as feed. It is projected that this percentage will rise to 45 percent by 1970 [average of 1969/70 and 1970/71], and to 50 percent by 1975 [average of 1974/75 and 1975/76]. This means that by 1975 the quantity of wheat fed will nearly double (39, p. 211).

Researchers at the Centre de Recherches et de Documentation sur la Consommation (CREDOC) concluded for France:

> ...it may be safely assumed that a fair share of French wheat production will not come into the market, but will be consumed on farms as feed. Wheat amounted to 21 percent of grain consumption as feed (measured in F.U.) 8/ in 1958/60. We assume the percentage will go up to 30 by 1970 and 33 by 1975 (8, p. 303).

In a similar supply and demand study for the Netherlands, researchers assumed that by 1970 wheat would cease to be used as feed in that country (1). They reasoned that within the framework of the EEC's market regulations, wheat as feed could be regarded as undesirable in the Netherlands. Declines have ocurred since 1960/61 in the quantity of wheat used for feed and the downtrend in the proportion of grain used in mixed (formulated) feeds (94). However, in no single year through 1955/56-1966/67 has the Netherlands, Italy, Belgium, and Luxembourg combined accounted for more than 15 percent of the wheat used for feed in the EEC.

Others have commented on factors affecting the quantity of wheat used for feed. Murray reasoned that year-to-year fluctuation in the amount of wheat used for feed depends on the quality of the wheat crop, the size of the feed grain crop, and the extent of Government subsidization (53). World market conditions for grains were listed by the Centre de Recherches et de Documentation

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7/ 1958 is an average of the crop-year period 1957-1959, 1962 is an average of the crop-year period 1961-1963, and 1970 is an average of the crop-year period 1969-1971.

8/ F.U. means feed unit. This study assumed that one feed unit is the energy equivalent to one kilogram of barley.

sur la Consommation as the major determinant of whether surplus soft wheat would be moved onto world markets or denatured and used for feed (8, p. 303). The hypothesis advanced by the Centre de Recherches et de Documentation sur la Consommation was reinforced by Farnsworth and Friedman who pointed to the active commercial export demand for French wheat in selected periods as an important reason for that Government's failure to raise denaturing subsidies (24). The importance of denaturing subsidies was emphasized by Dam who viewed their role as a "financial device for accomodating surpluses in bread grains and shortages in feed grains" (10).

Langen stated that, owing to higher yields, more, and probably cheaper, feed units could be obtained per hectare of wheat than of barley (47). Consequently, he contended that the right economic solution to the EEC's surplus soft wheat problem was to feed more wheat rather than make a substantial switch from production of wheat to feed grains. To achieve this, it was pointed out that the price ratio of wheat and feed grains must be more closely linked to feed value. Grain price ratios, established under EEC regulations were considered unreal in terms of the relative feeding values of wheat and feed grains and to discriminate against the feeding of wheat. Epp agreed with Langen that wheat was overpriced relative to its feeding value, but pointed out that actual market prices of wheat will tend toward the lower intervention level while feed grain prices will be above the intervention level (14). This will act to narrow the price gap.

Conflicting information on grain prices in the EEC was discussed by Farnsworth and Friedmann. They noted complications of the pricing problem arising from different ratings of relative feed values. The authors concluded that grain target prices set by the EEC for 1967/68 favor corn over wheat and other feed grains. According to Farnsworth and Friedmann:

> ...the EEC Commission and Council presumably gave primary consideration to the important role of moderate-priced maize [corn] in Italy's agriculture and general economy and to the limited area of the Community suitable for maize production outside of Italy and southwest France (24, p. 103).

Factors relating to freight costs and transportation problems, regional aspects of price harmonization, and EEC grain policy have been discussed in various studies. The analysis by Muller and Schnieders was beneficial in identifying grain surplus and deficit areas in the Community and freight costs and transportation problems associated with grain flows (52). Studies by Clarke and Goodman and Butterwick and Neville-Rolfe further identified and described grain flows in the EEC (9, 5). Work by Stein and Ruf treated problems of grain price comparability between member countries (75). The two reports by Farnsworth and Friedmann include vast amounts of information on the whole spectrum of the EEC's common agricultural policy for grains and on the pre-EEC grain policies of France and West Germany (24, 31). Investigations by Schertz on the comparative costs of the EEC denaturing or exporting soft wheat concluded that disposition of surplus production may be influenced by relations between world prices of wheat and feed grains (66).

WHEAT POLICIES AND MARKETING REGULATIONS

Policies Prior to Formation of the Common Agricultural Policy

The grain regulations of the individual member countries of the EEC, as Schaben has shown (64), differed substantially prior to establishment of common market regulations. Despite the many differences, one feature was common to all member states, namely, the application of measures to control imports and assure domestic producers a market for their grain at prices above the world market level.

West Germany

"Skimming" 9/ was practiced by West Germany on imports of both wheat and feed grains prior to the formation of the Common Agricultural Policy (CAP). Import requirements of individual grains were determined annually and import licenses were issued to private traders who offered the lowest bids on the specified grade and quantity of grain to be imported. The import licenses also specified delivery periods and the countries from which the grains could be imported.

Price supports and price ceilings for domestically produced grains were also applied by the West German Government. When prices fell to a specified minimum level, the Import Storage Agency was obligated to buy grain from producers. Conversely, grain sales were made by the Agency when market prices rose above a given maximum level.

A number of other policies pursued by the West German Government also influenced grain imports. Mixing regulations required the use of a certain percentage of home-grown wheat in flour milling (80 percent in 1961). Purchases of domestic grains for feed were required as a precondition for receiving feed grain import certificates. Bilateral trading agreements with some countries discriminated against imports from other countries.

France

The National Grain Office (ONIC--Office National Inter-professionnel des Cereales), created in November 1940, had authority to guarantee producer prices for wheat and coarse grains and to control imports and exports. Support prices for soft wheat were limited to a given quantity (called the "quantum") and were scaled downward as the amount delivered increased. The "quantum" varied from year to year, depending on the size of harvest and domestic milling requirements.

Various taxes, storage, and handling charges were deducted from the support prices of wheat and feed grains. Part of the taxes were used for export subsidies (along with funds provided by the Federal Treasury) since producer support

9/ "Skimming" refers to a fee collected by the government of the importing country to equalize the price of imported grain with the price of domestically produced grains.

prices were above world market prices. However, producer prices of above "quantum" wheat deliveries were limited to the average price received for these exports during the marketing year.

Italy

Wheat and flour imports were permitted only on behalf of a Government agency, the Federazione Italiana Consorzi Agrari. The imported wheat was then marketed to millers at the higher prices prevailing in domestic markets. Producers received a guaranteed price for a specified quantity of the wheat crop which they were required to deliver to the Government. Higher support prices were paid for durum than soft wheat, with prices varying by producing area. Output in excess of compulsory deliveries could be marketed directly to private traders but prices of these marketings tended to remain near support prices because of Government import controls. There were no price supports for feed grains and imports were by private traders.

Netherlands

The Netherlands required an admixture of domestically produced wheat in milling (30 percent in 1960/61) and imposed quantitative limitations on duty-free imports of wheat flour (65,000 tons in 1960/61) as devices for supporting domestic wheat prices. Flour imports above this amount were dutiable at 3 percent ad valorem. In addition, wheat imports were subject to a fee of 8.7 cents per bushel while flour was subject to a fee of 82 cents per 100 pounds on amounts imported for human consumption. The fee imposed on flour was to equalize the price of imported flour with domestically produced flour.

Variable import levies were imposed on feed grain imports to maintain producer support prices. Minimum c.i.f. import prices were established for each grain and the levy collected was the difference between these minimum import prices and the c.i.f. price at Dutch ports. At the same time, provisions were made for rebates on exports or reexports of feed grains (as well as wheat flour) and on livestock and meat products produced from imported grains. Import licenses were required for feed grains as well as wheat.

Belgium and Luxembourg 10/

Wheat support prices were limited by the Belgian Government to 700,000 metric tons in 1960. This amount of wheat was required to maintain a 70 percent mixing ratio of domestic wheat to outside purchases in flour milling as required by the Government. Marketings in excess of the amount prescribed for domestic flour use were used as feed or exported at market prices.

Support prices were not provided for feed grains. However, in 1956 the Government authorized a subsidy to farmers on the basis of feed grain acreage.

10/ Luxembourg was not discussed separately because of close economic ties with Belgium and its small population.

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More importantly, a system of feed grain import licenses and taxes was established in 1957. This action resulted in feed grain imports at prices substantially above c.i.f. offer prices at Antwerp or other Belgian ports and increased prices for domestically produced grain. The tax receipts were used to subsidize livestock producers, grain exports, and costs of diverting wheat to feed use.

Major Provisions of EEC Marketing Regulations for Grains

The Rome Treaty, signed in March 1957, made provisions for the Common Market to extend to agriculture and trade in agricultural products (Title II, Articles 38-47). It was not until January 14, 1962, however, that the EEC Council issued their first basic decisions on a common agricultural policy (CAP). Commodities covered by these first regulations included wheat, flour, feed grains, pork, poultry and eggs, fruits and vegetables, and wine. Regulations on these commodities (or some part of each commodity group) became effective July 30, 1962.

Agreement on Basic Grain Regulation

Regulation No. 19 of January 14, 1962 11/ provided the basic outline of a common organization of the market in grains. Provisions were made for establishing: (1) basic "target" and "intervention" (support) prices at the wholesale level in the major grain deficit marketing centers of each country; (2) derived target and intervention prices in other marketing centers, giving consideration to transportation costs; and (3) "threshold" (minimum import) prices at port of entry or border at a level to prevent undercutting of basic target prices. The variable levies imposed on grain imports were determined by subtracting the most favorable c.i.f. import price from the threshold price 12/.

These grain regulations replaced the various policy measures previously in effect in member countries, eliminating controls such as compulsory mixing and quantity import restriction. However, member countries were free during the transition period to set their annual grain prices within a rather wide range prescribed by the Community 13/. Consequently, the intervention and threshold prices also varied by member countries. National Government agencies were

11/ European Communities, Journal Officiel des Communautes Europeennes, Brussels, April 20, 1962.

12/ The c.i.f. offer prices for different types of wheat are adjusted by equivalence coefficients to an EEC "standard quality" to determine what levy to apply (appendix table 4). During the transition period--July 30, 1962 to July 1, 1967--national "standard quality" differed from "EEC standard quality" for some member countries.

13/ This situation was discussed by Donald J. Novotny and Robert J. Svec in "European Economic Community's Grain Price Systems in Operation," Foreign Agriculture, Washington, U.S. Department of Agriculture, 1967. At the beginning of the 1962/63 crop year, the target price for soft wheat ranged from an upper limit of $118.92 per metric ton to a lower limit of $89.42 per metric ton. Little actual progress was made in moving member country prices much closer together during the transition period.

required to purchase all quantities of grain offered to them at the intervention price which was specified by individual countries at between 90 and 95 percent of the designated target prices.

Threshold prices established by the member countries provided for a $1.00 per ton preference on intra-Community trade in grain (called the "montant forfaitaire"). After setting the target price, the threshold price was arrived at by (1) subtracting marketing costs from port of entry to the deficit area, (2) adding $1.00 per metric ton 14/ for Community preference, and (3) adjusting prices to reflect national quality standards if different from Community quality standards. On intra-Community trade, the $1.00 per ton charge was subtracted from the levy applicable between the member countries during the transition period 15/.

The basic grain regulation (No. 19 of January 14, 1962) provided for subsidizing exports to both member and nonmember countries. Subsidies on grain exports to nonmember countries were, in general, not to exceed the levies applicable to imports from third countries on the date of export. It was also permissible to import, free from levies, quantities equal to those exported. Intra-Community trade during the transition period could be subsidized to the extent that the exporting countries free-on-frontier price was reduced to the importing country's threshold price (but limited to the subsidies permitted for exports to third countries).

The basic regulations provided that stocks of wheat and rye (accumulated through intervention in the market) could be denatured and sold in domestic markets. Each member Government was also allowed to promote the denaturing of privately held stocks of wheat and rye through the payment of denaturing premiums.

Agreement on Common Grain Prices

On December 15, 1964, the EEC Council of Ministers reached agreement on common grain prices to be effective July 1, 1967. Prices were set roughly halfway between the highest and lowest prices effective in the EEC in 1964/65. Basic target prices--set for soft wheat, durum wheat, barley, corn, and rye--applied to Duisburg, West Germany, the most deficit grain area of the Community.

14/ Increased to $1.10 in 1963/64.

15/ A much higher level of protection was provided for flour. The threshold price for 1.4 metric tons of wheat was first computed (since this was considered equivalent to 1 metric ton of flour). To this, a milling margin of $19.25 per metric ton (average milling costs in the EEC) was added and a protection allowance of $16.25 (applicable to other member countries as well as to third countries). From this total, a credit for the feed by-products of the 1.4 tons of milled wheat was subtracted. Added to this was a lump sum of $2.50 per ton for further protection to the EEC millers (and applicable only to third countries). During the transition period, the protection allowance and the lump sum were to be gradually reduced and increased respectively by the same amounts so that the protection would apply only to third countries.

As in the earlier basic grain regulations, provisions were made for establishing derived target and intervention prices in other trading centers to reflect transportation costs and promote the free movement of grains inside the Community.

Grain prices in member countries were affected differently by the December 1964 decisions. Soft wheat prices 16/(set at $106.25 per metric ton) were reduced in West Germany, Luxembourg, and Italy, but increased in France, the Netherlands, and Belgium. Target prices for durum wheat were set at $125 per metric ton, resulting in a price increase in France and a price decrease in Italy. (However, producers were guaranteed $145 per metric ton at wholesale level in the largest surplus area in the EEC.) Price shifts similar to those for soft wheat also applied to rye (excluding Italy where little rye was grown) with the target price set at $93.75.

Barley target prices ($91.25 per metric ton) set by the Council resulted in a price reduction in West Germany but a price increase in all other member countries. The common corn price ($90.63 per metric ton) resulted in a reduction in the French price but a sharp increase in the Italian price. (Little corn was produced as grain in the other EEC countries.) Since the feed grain price increases were viewed as extremely burdensome to the livestock industry in Italy--which relied heavily on imports--provisions were made for Italy to have 5 years to adjust to the common feed grain prices 17/.

In addition to this major provision for Italy, there was another major provision for compensating payments to West Germany, Italy, and Luxembourg because of the rather sharp decline in wheat price 18/. Additional financial assistance was provided to their farmers by the West Germany Government 19/.

Harmonized Prices

Council Regulation No. 120/67 20/ contained the new EEC grain regulations which went into effect on July 1, 1967 (this basic regulation was followed by many implementing regulations). The special rules applying to feed grains in Italy remained in effect. Significant provisions of the new regulations (with the exception of the proviso for Italy) were as follows:

(1) Grain prices within the EEC became largely interdependent,

(2) The foundation for unified markets for other products was established,

16/ Unless otherwise specified, all prices quoted here refer to wholesale prices at Duisburg, West Germany.

17/ Imports of barley, oats, corn, and grain sorghum by sea were to receive an import subsidy of $10.63 per ton in 1967/68, $10.00 per ton in 1968/69 and 1969/70, and $7.50 per ton in 1970/71 and 1971/72. However, this subsidy was largely offset by the increased transportation and handling costs in shipping grain into Italy, compared with other member countries.

18/ $280.2 million to West Germany, $131 million to Italy, and $2.5 million to Luxembourg on a declining yearly scale for 1967/68, 1968/69, and 1969/70.

19/ $210 million in 1965 and $275 million annually in 1966 and 1967.

20/ European Communities, Journal Official, Brussels, June 13, 1967.

(3) Conditions for free trade in the Community were created, and

(4) The preference of domestic producers relative to third country suppliers was further increased.

Intervention prices, threshold prices, and target prices were continued at the wholesale level of trade. Duisburg remained as the principal deficit area--the point of the basic intervention (support) price. Regionally derived support prices were set so as to reflect the varying conditions of supply and demand in order to promote intra-Community trade. The new regulation also established a uniform threshold price (minimum import price) which previously had varied by member country. Levies imposed on imports were to represent the difference between the lowest c.i.f. price 21/ and the uniform threshold price (figure 1).

Basic provisions were also made in the new regulations for differentiating grain export subsidies according to country of destination. As with earlier basic regulations, intervention agencies were permitted to dispose of purchases through export to third countries or sales on the domestic market. A special denaturing premium was to be provided for disposing of wheat and rye for feed. The actual cost of denaturing was also to be covered.

Community Regulations on Denaturing Wheat for Feed 22/

EEC countries have followed either of two general alternatives for disposing of surplus soft wheat entering marketing channels in the EEC--denaturing wheat for feed and subsidizing exports. The purpose in each case was to support the domestic wheat market. Regulations on denaturing have, at least until recent years, carefully avoided creating conditions where sales of denatured wheat interfered with the market for corn and barley. This precaution has restrained the movement of larger quantities of wheat into feed use.

Numerous regulations on denaturing wheat have been variously presented in meticulous detail, expanded, changed, rescinded, and reissued.

Developments Prior to Common Prices

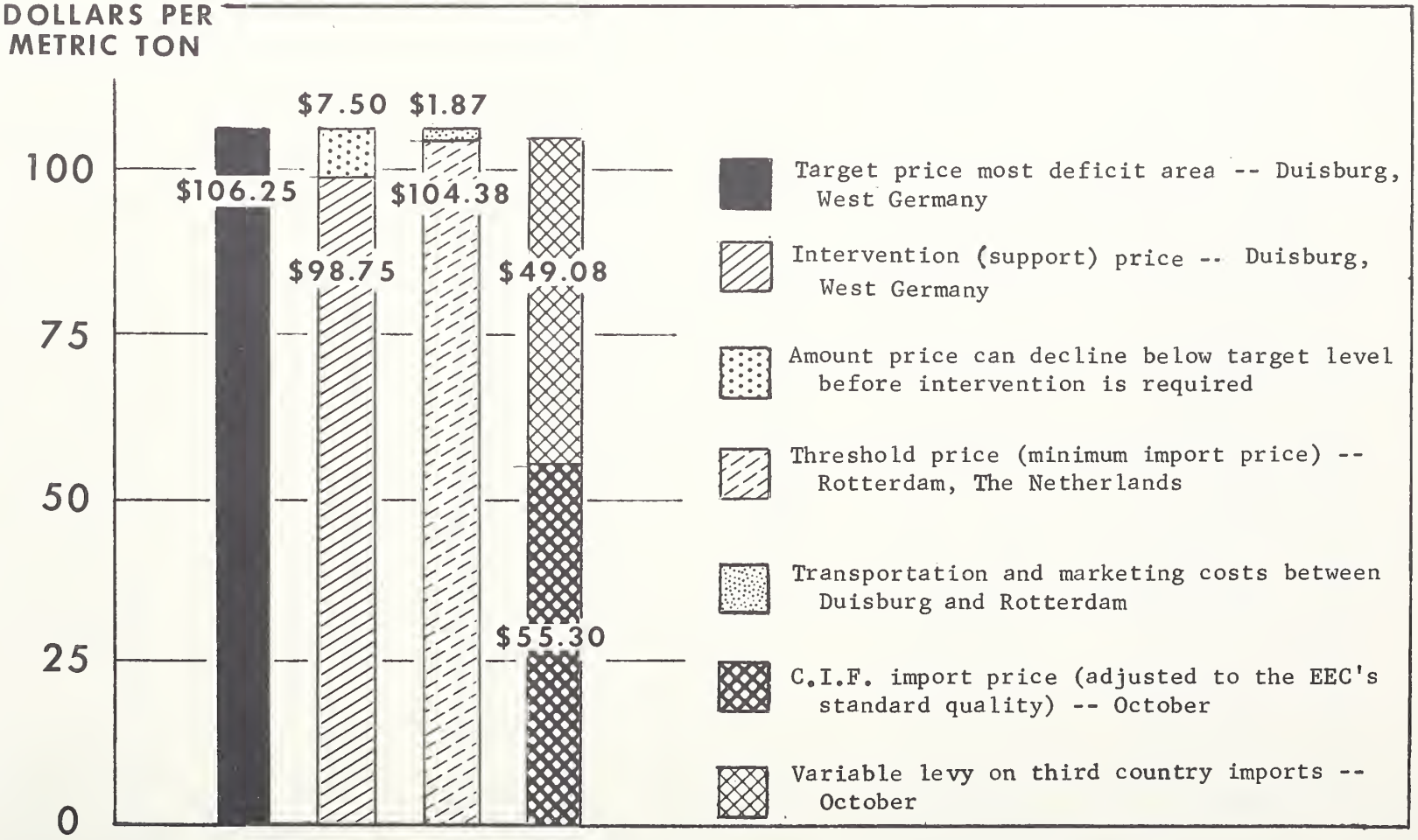
The Community's basic authorization on denaturing wheat for feed was contained in their first basic grain regulation (No. 19, January 14, 1962). At this time, the intervention agencies in member states were authorized to sell wheat at reduced prices provided it had been rendered unfit for human consumption. Council Regulation No. 25 23/ authorized the use of funds from the

21/ The c.i.f. price was the lowest offer price in Rotterdam, or in another import point plus freight rates to Rotterdam, whichever was lowest (well intentioned offers of reasonable quantity adjusted to the EEC's standard quality).

22/ Many of the same provisions apply to rye which is not included in the following discussion.

23/ European Communities, Journal Officiel, Brussels, April 20, 1962.

GRAIN IMPORT CONTROL SYSTEM FOR WHEAT (EXCLUDING DURUM) FOR THE EUROPEAN ECONOMIC COMMUNITY, AUGUST 1, 1968



SOURCE: COMPUTED FROM DATA AND REFERENCES GIVEN IN TABLE 21.

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Figure 1
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European Agricultural Guidance and Guarantee Fund (EAGGF)--the financial arm of the CAP--to support internal market operations. Council Regulations 17/64 and 18/64 24/ further specified the categories and amounts of denaturing expenditures eligible for aid from the Fund. One element of the denaturing premium was a payment of 90 percent of the difference between the target price of soft wheat and the target price of barley 25/. The second element of the denaturing premium was the technical costs involved in the physical process of denaturing grain. Provisions were made for determination of minimum quality standards above which wheat would be eligible for denaturing payments.

Commission Regulation 127/64 26/ set the technical cost of denaturing wheat at $1.90 per metric ton for 1962/63 and 1963/64. On the same date, Commission Regulation 128/64 set the following criteria for wheat considered fit for human consumption (and thus eligible for a denaturing premium): minimum specific weight--70 kilograms per hectoliter; maximum of other cereals, various impurities, and germinated grains--12 percent. These criteria were applicable in 1964/65 to sound, pure, commercial quality wheat free from defects.

The Commission issued Regulation No. 178/64 27/ which replaced previous rules covering denaturing premiums. Although the basic features of previous regulations were retained, more specifics were provided on the technical methods of denaturing and on restrictions pertaining to the quality of wheat eligible for denaturing premiums.

Commission Regulation 178/64 appeared to have contained a more cautious approach to payments of denaturing premiums than did earlier published regulations. Under this regulation, the denaturing premiums could not exceed the difference between the average market price of wheat in the area of largest surplus and the target price for barley during the same period and in the same area (all prices adjusted to a "standard quality") 28/. It was also stated that in no case should the denaturing premium for wheat be fixed at such a level as to interfere with the target price of barley or corn nor should the denaturing premium result in wheat normally used directly for feed on the farm being sold and replaced by denatured grains.

This same regulation also set forth a suggested method of denaturing grain. Member states were permitted to use an alternate method if it provided equal assurances that the denatured wheat would no longer be used for human consumption. Reductions in the denaturing premium were also specified for wheat falling below a specified weight per hectoliter or containing impurities above specified levels.

24/ European Communities, Journal Officiel, Brussels, February 27, 1964.

25/ The payment applied to the area having the greatest surplus of wheat and to prices in the first month of the marketing season. It will be noted that some of the decisions pertaining to payment of denaturing premiums also refer back to an earlier period. A lag of 2-4 years occurred before member state expenditures on market support were reimbursed by EAGGF.

26/ European Communities, Journal Officiel, Brussels, September 30, 1964.

27/ European Communities, Journal Officiel, Brussels, November 19, 1964.

28/ The denaturation premium would tend to fall since the market price of soft wheat in the most surplus area would be more towards the intervention (support) level, which is 5 to 10 percent below the target price.

Denaturing Regulations Effective at Time of Common Prices

Council Regulation No. 120/67 introduced common prices to the whole of the Community on July 1, 1967 29/. This action abolished intra-Community levies for domestic grains and established uniform third country levies. Only broad guidelines for denaturation of grains were provided in this basic regulation.

Additional general guidelines on denaturation were provided in Council Regulation No. 172/67 30/. Once again, the caveat that the denaturing premium must not interfere with the market for barley or corn appeared. Authorization was given to intervention agencies to denature grains as well as the responsibility for approving and supervising all denaturing of grains. Premiums on denatured wheat were to be fixed before the beginning of the marketing year and considered valid for the whole year. Export subsidies on denatured wheat were to equal those applied to barley.

Commission Regulation 241/67 31/, which also became effective July 1, 1967, provided for either the dyeing (denaturing) of wheat or its admixture into compound feeds. The provision for direct use of wheat in compound feed with the payment of a denaturing premium represented a liberalization of the denaturing regulations. Technical costs for dyeing were set at $1.90 per metric ton and those for admixing at $1.00 per ton. These technical costs were added to a per ton payment to make wheat competitive with feed grains (the payment ranged from $11.65 in July 1967 to $14.20 in July 1968). Provisions in Commission Regulation 242/67--appearing in the same issue of Journal Officiel as 241/67--provided for reducing the denaturing premium if the grain was below a standard quality (with weight and moisture conditions varying by region but the proportion of foreign grain, impurities, and sprouted grain the same for the whole area).

Regulation Changes Since Common Prices

Provisions for a liberalization of the denaturing regulations were contained in Council Regulation 644/68 32/. This regulation permitted, for the first time, adjustments in the denaturing premium in the course of the crop year. Also potentially important was the proviso requiring Italy to (1) grant a subsidy on imports by sea of denatured wheat equal to the reduction of the levy applied to barley, and (2) increase the denaturing premium for soft wheat in Italy by an amount equal to the levy reduction applying to barley.

New implementing regulations for denaturing wheat in 1968/69 were presented in Commission Regulation's 956/68 and 957/68 33/(table 3). While the first

29/ European Communities, Journal Officiel, Brussels, June 13, 1967. Feed grain trade between Italy and third countries and Italy and other member countries were to be continued under special rules until July 31, 1972.
30/ European Communities, Journal Officiel, Brussels, June 27, 1967.
31/ European Communities, Journal Officiel, Brussels, June 30, 1967.
32/ European Communities, Journal Officiel, Brussels, May 29, 1968.
33/ European Communities, Journal Officiel, Brussels, July 12, 1968.

Table 3.--Denaturing subsidies for soft wheat in the EEC for the marketing year 1968/69 1, 2/

Month and year	Subsidy adjusting wheat prices to barley prices	Technical subsidy: Dyeing or adding fish oil	Technical subsidy: Adding directly to feed	Total subsidy: Dyeing or adding fish oil	Total subsidy: Adding directly to feed
	$ per metric ton				
August 1968	10.77	3.25	1.25	14.02	12.02
September 1968	11.72	3.25	1.25	14.97	12.97
October 1968	11.92	3.25	1.25	15.17	13.17
November 1968	12.12	3.25	1.25	15.37	13.37
December 1968	12.32	3.25	1.25	15.57	13.57
January 1969	12.52	3.75	1.75	16.27	14.27
February 1969	12.72	3.75	1.75	16.47	14.47
March 1969	12.92	3.75	1.75	16.67	14.67
April 1969	15.12	3.75	1.75	18.87	16.87
May 1969	15.32	3.75	1.75	19.07	17.07
June 1969	15.32	3.75	1.75	19.07	17.07
July 1969	15.32	3.75	1.75	19.07	17.07

1/ In Italy, the total amount of the above subsidy was to be increased (under certain specified conditions) by an amount equal to the reduction of the levy applicable to barley on the day of denaturing or admixing.
2/ Data includes changes made throughout the 1968/69 marketing year.

Source: European Communities, Journal Officiel des Communautes Europeennes, Brussels, various issues, July 12, 1968, December 20, 1968, March 28, 1969.

element of the denaturing premium was decreased slightly from the earlier regulation--by 88 cents per metric ton--the allowance for denaturing was increased from $1.90 to $3.25 per ton and for admixture from $1.00 to $1.25 per ton. The total amount of the premium for denaturing thus increased 47 cents per metric ton while the premium for admixing fell by 63 cents per metric ton. As in earlier regulations, the amount of the premium varied with the weight of the grain and with the level of foreign grain, impurities, and sprouting (table 4). The proviso for adjusting the premium in the course of the crop year was also continued.

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Table 4.--Adjustments applying to the denaturing subsidy for soft wheat in the EEC for the marketing year 1968/69

Test weight	Increase or decrease in denaturing subsidy
Kilograms per hectoliter	- - $ per metric ton - -
70-70.999	-1.50
71-71.999	-1.00
72-72.999	-0.50
73-77	0.00
77.001-78	+0.50
78.001-79	+1.00
79.001-80	+1.50
More than 80	+2.00
Foreign grains, impurities, and sprouting	
- - - Percent - - -	
Up to 4	0.00
4.01 to 5	-0.75
5.01 to 6	-1.25
6.01 to 7	-1.75
7.01 to 8	-2.25
8.01 to 9	-2.70
9.01 to 10	-3.20

Source: European Communities, Journal Officiel des Communautes Europeennes, Brussels, July 12, 1968.

Effective January 1, 1969, the Commission allowed a 50-cent per ton increase in the technical costs of denaturing and admixing wheat for the remainder of 1968/69 34/ (table 3). The reasons advanced for this increase were that costs of denaturing and incorporating had risen, that the large soft wheat crop in 1968 was placing pressure on domestic markets, and that difficulties were being experienced in locating export markets. Authorization was also given during the year to denature with fish oil--instead of with the more expensive dyeing process--without any lowering of the cost factor. Consequently, the allowances for denaturing costs were more or less arbitrary since they failed to reflect actual costs.

The provision for changing the premium for denaturing soft wheat within a marketing year was brought into play on April 1, 1969 35/ The first element

34/ European Communities, Journal Officiel, Brussels, December 20, 1968.
35/ European Communities, Journal Officiel, Brussels, March 28, 1969.

of the premium was increased by more than $2 per ton (over originally scheduled levels) for the remainder of the marketing year--April through July. This action pushed the premium for soft wheat to $19.07 per metric ton for denaturing and $17.07 per ton for admixing during the last 3 months of the 1968/69 marketing year. Justification was on the basis of preventing severe internal "market disturbances" brought about by the high level of wheat stocks and the unsatisfactory rate of wheat exports.

Denaturing premiums for wheat were increased again for the 1969/70 marketing year (table 5). The premium for August 1, 1969 denaturing and admixing were set at $18.52 and $17.52 per metric ton, respectively, compared with $14.02 and $12.02 in August 1968 36/(table 3). Thus, the total increase in the premium for August through April was $4.50 per ton for denaturing and $5.50 per ton for admixing. The purpose of both increases was to move more wheat into feed use.

In addition to the premium increases, the EEC's Grain Management Committee also liberalized the acceptable amount of objectionable material in the 1969 wheat crop 37/. The permissible amount of sprouted grains, foreign material, and so forth in wheat still qualifying for a denaturing premium (but at a reduced level) was increased from 10 to 50 percent (table 5). This special concession was made mainly at the request of West Germany where late August rains substantially reduced the quality of the crop which remained unharvested at that time.

WHEAT AS A FEED

The use of wheat for feed generally increased in the Community since 1955/56, surpassing 5.8 million metric tons in 1967/68 (table 6). Nearly one-fifth of the annual wheat crop was moved into feed use in most years since 1958/59. During the same time, wheat generally accounted for 13-14 percent of total grains used for feed. France and West Germany accounted for over 95 percent of the wheat used for feed in the Community.

Wheat is moved into feed use by one of two methods. One method is through direct on-farm use without benefit of subsidization. This outlet presumably would include the production and direct use of wheat for feed on farms, as well as the direct sale or exchange of wheat for feed among farmers. A second method by which wheat is moved into feed use is through commercial channels. This includes the sale of wheat to commercial establishments for use as feed or for feed formulation as well as wheat moved into feed use through payment of a denaturing premium. This is done so that milling wheat is competitive with feed grains for use in livestock rations. As indicated in table 6, about three-fourths of the wheat used for feed was fed directly on farms.

Rather widespread farmer familiarity with feeding wheat may aid in an expanded use of wheat for feed, particularly under improved wheat/feed grain price ratios. According to Morrison, when properly used, wheat is satisfactory for

36/ European Communities, Journal Officiel, Brussels, July 18, 1969 and August 9, 1969.

37/ European Communities, Journal Officiel, Brussels, September 11, 1969.

Table 5.--Denaturing subsidy for soft wheat, selected rules, and special provisions for germinated wheat in the EEC, marketing year 1969/70

Month and year	Subsidies		Special provisions for sprouting, foreign grain, impurities, etc. 1/	
	Dyeing or adding fish oil	Adding directly to feed		
	- $ per metric ton -		Percent of sprouting, etc.	$ reduction per metric ton
August 1969	18.52	17.52	10.01 to 14.00	1.00
September 1969	19.47	18.47	14.01 to 18.00	2.00
October 1969	19.67	18.67	18.01 to 22.00	3.00
November 1969	19.87	18.87	22.01 to 26.00	4.00
December 1969	20.07	19.07	26.01 to 30.00	5.00
January 1970	20.27	19.27	30.01 to 34.00	6.00
February 1970	20.47	19.47	34.01 to 38.00	7.00
March 1970	20.67	19.67	38.01 to 42.00	8.00
April 1970	20.87	19.87	42.01 to 46.00	9.00
May 1970	21.07	20.07	46.01 to 50.00	10.00
June 1970	21.07	20.07		
July 1970	21.07	20.07		

Selected Denaturing Rules for Soft Wheat:

Grain denatured by the intervention agencies or for which a denaturing premium is being granted must be of sound quality customary in trade. This means that the grain must be of proper odor and have: (1) a test weight of 70-73 kg/hl fixed by the intervention agencies according to region, (2) a moisture content not to exceed 14-18 percent according to region, (3) sprouted grains must not exceed 8 percent, foreign grains 3 percent, and other impurities 3 percent, and the shares together must not exceed 10 percent.

The denaturing premium shall consist of two elements, the difference between the price of soft wheat and barley and standard technical costs of denaturing or admixing.

The denaturing premium shall be increased for soft wheat with a test weight exceeding 77 kg/hl.

Intervention agencies will have control over the granting of the denaturing premiums.

The duration of denaturing must not exceed one day for 40 tons of processed grain. Admixing to feeds must not exceed 30 days for 50 tons of processed grain or a working day of 8 hours for 20 tons (provisions are made for payment in the event of technical difficulties in production).

1/ Previous regulations apply when the percentage of other grains, various impurities, and sprouted grains does not exceed 10 percent.

Source: European Communities, Journal Officiel des Communautes Europeennes, Brussels, various issues, July 18, 1969, August 28, 1969, September 11, 1969.

Table 6.--Wheat used for feed in the EEC
1955/56-1967/68

Year	Total	Directly on farms	Through commercial channels	As a percentage of wheat production	As a percentage of all grains used for feed
	- - 1,000 metric tons - -			- - - - - Percent - - - - -	
1955/56	3,350	2,813	537	13.8	12.9
1956/57	1,935	1,442	493	10.3	6.7
1957/58	3,954	2,310	1,644	16.1	12.6
1958/59	4,455	2,978	1,477	18.3	15.0
1959/60	5,472	3,919	1,553	21.2	16.7
1960/61	4,886	3,499	1,387	20.2	14.7
1961/62	4,484	2,989	1,495	19.4	13.1
1962/63	5,074	3,635	1,439	17.2	14.4
1963/64	4,658	3,614	1,044	19.1	12.2
1964/65	5,525	4,421	1,104	18.9	14.3
1965/66	5,346	3,956	1,390	17.6	13.6
1966/67	5,540	4,331	1,209	21.1	13.4
1967/68	5,829	4,784	1,045	18.7	13.1

Source: Computed from Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 1, 1968 and No. 1, 1969.

all classes of stock 38/. It is equal or nearly equal to corn in feeding value. Compared with corn, wheat is superior in protein, contains as much nitrogen-free extract, is only slightly higher in fiber, and is fully as digestible. Wheat supplies about as much total digestible nutrients (TDN) as does dent corn of No. 2 grade.

38/ The discussion from pages 20-22 follows closely Frank B. Morrison's Feeds and Feeding--A Handbook for the Student and Stockman, Clinton, Iowa, The Morrison Publishing Company, 1959, and refers to feeding experiments conducted in the United States.

Wheat should be ground to only a medium degree of fineness for maximum palatability. It is usually well-liked by livestock. Digestive disturbances or "off feed" problems can result if cattle or sheep are fed heavily on wheat.

Wheat is equal to or slightly superior to corn in poultry feeding. It is palatable and furnishes variety to the ration. Wheat can be used satisfactorily as a complete substitute for yellow corn if supplemented by vitamin A from other feeds. Soft wheat, such as that produced in the European Community, is more palatable to poultry than hard wheat when the whole grain is fed. It is recommended that new crop wheat not be fed to poultry until it has dried out and passed through a sweat (51, p. 440) 39/.

Good quality wheat is extremely palatable for hogs and considered slightly superior to corn as a feed. Also, the higher protein level of wheat requires less protein supplement than does corn.

Grinding wheat for hogs is considered desirable when hand-fed but not worth the expense when fed in self-feeders. Excellent results have been obtained when wheat was the only grain fed to hogs. However, when wheat is the only grain fed, there is more of a tendency for hogs to go "off feed" than when corn or barley is fed. As a consequence, it is well to mix other grains with the wheat.

Ground wheat is about equal to ground corn for dairy cattle. Since wheat is a heavy feed, mixing with a bulky concentrate is recommended. Best results are believed to occur when wheat does not form more than one-third to one-half of the concentrate mixture.

Wheat is less palatable than corn for beef cattle and the likelihood of cattle going "off feed" is greater when fed heavily on wheat than when other grains are used. Consequently, other grains should be mixed with wheat for fattening cattle. Mixtures of one-half wheat (by weight) and one-half corn, barley, or oats have produced gains equal to those of corn. An alternative method would be to use silage or some other bulky feed with wheat.

Wheat is not well utilized by cattle unless coarsely ground or crushed. When fed in this form with other grains, the feeding value of wheat is considered to be fully equal to corn.

Both fattening lambs and ewes make satisfactory gains from wheat. However, lambs show less tendency to go "off feed" and better results are achieved if wheat is fed in combination with shelled corn, barley, grain sorghum, or oats. Whole wheat is more palatable and more efficient for sheep than is ground or crushed wheat.

Use of Wheat by Species of Livestock

One brief study which related closely to this topic was carried out by FAO over a decade ago (25). The survey showed that in France, West Germany,

39/ Some persons believe that the feeding of new wheat tends to produce blue comb or pullet disease.

and the Netherlands approximately two-thirds of the wheat used for feed was fed to poultry in 1955/56-1957/58 (table 7). A substantial proportion of the wheat used for feed was also fed to hogs. Relatively insignificant proportions were consumed by cattle, sheep, or horses.

Table 7.--Percentage consumption of wheat by species of livestock in France, West Germany, and the Netherlands, average 1955/56-1957/58

Country	Total	Poultry	Hogs	Cattle	Sheep and goats	Horses and mules
	- - - - - - - - - - Percent - - - - - - - - - -					
France . . .	100	68	20	6	6	--
West Germany	100	63	30	7	--	--
Netherlands.	100	69	21	9 1/	--	1 2/

1/ Includes sheep and goats. 2/ Includes "other livestock".

Source: (25).

EEC 40/ estimates of feed use of wheat for 1958/59 through 1964/65 showed the following approximate allocations by species of livestock: poultry, 55 percent; hogs, 20 percent; cattle, 10 percent; other classes of livestock, 15 percent (table 8). No shifts in the proportion of wheat used by class of livestock was estimated during this period for France. West Germany showed an increasing proportion of wheat fed to hogs and cattle at the expense of poultry. Allocation of wheat by class of livestock showed considerable year-to-year variation in the Netherlands with some gains to poultry. In Italy, the use of wheat for feed shifted entirely to poultry.

Current data were not available on the percentage of wheat consumed by different species of livestock. However, total animal inventories have continued to increase. Hog and poultry numbers have increased more rapidly than have cattle numbers. In view of the relatively rapid increase in hog and poultry numbers, as well as the importance of these classes of livestock in grain utilization, poultry and hogs probably will continue to account for a large proportion of the wheat used for feed.

40/ Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 9, 1967, pp. 20-63. Belgium-Luxembourg is excluded from the data presented here.

Table 8.--Percentage consumption of wheat by species of livestock, EEC, and member countries, 1958/59-1964/65

Country and species of livestock	1958/ 1959	1959/ 1960	1960/ 1961	1961/ 1962	1962/ 1963	1963/ 1964	1964/ 1965
	Percent						
EEC 1/	100	100	100	100	100	100	100
Cattle	11	11	11	10	10	10	10
Hogs	18	19	20	22	18	21	19
Poultry	56	55	54	56	56	54	54
Other animals	15	15	15	12	16	15	17
West Germany	100	100	100	100	100	100	100
Cattle	7	7	9	7	8	11	11
Hogs	29	30	34	33	34	38	40
Poultry	64	63	57	60	58	51	49
Other animals	---	---	---	---	---	---	---
France 2/	100	100	100	100	100	100	100
Cattle	10	10	10	10	10	10	10
Hogs	10	10	10	10	10	10	10
Poultry	55	55	55	55	55	55	55
Other animals	25	25	25	25	25	25	25
Italy	100	100	100	100	100	100	100
Cattle	48	48	48	---	---	---	---
Hogs	22	22	22	---	---	---	---
Poultry	26	26	26	100	100	100	100
Other animals	4	4	4	---	---	---	---
Netherlands	100	100	100	100	100	100	100
Cattle	7	17	18	23	24	11	20
Hogs	37	39	32	33	22	31	26
Poultry	54	43	47	41	54	58	54
Other animals	2	1	3	3	---	---	---

1/ Excludes Belgium-Luxembourg.
2/ All data for France are estimated.

Source: Appendix table 5.

Wheat was a more important component in grains fed to poultry than for other types of livestock in the EEC during 1958/59-1964/65 41/(table 9). However, the proportion of wheat in poultry rations varied widely between some member countries (appendix table 7). The share of cattle grain rations made up of wheat was about equal to that for hogs in France, West Germany, and the Netherlands.

Table 9.--Percentage share of types of grains in total grain fed to selected species of livestock, EEC 1/ average for 1958/59-1964/65

Species of livestock	Total	Wheat	Rye	Barley	Oats	Corn	Other grains
	Percent						
All livestock . . .	100	15	8	23	21	30	3
Cattle.	100	8	9	36	28	17	2
Hogs.	100	8	14	36	16	22	4
Poultry	100	25	3	6	9	53	4
Other animals .	100	21	1	3	65	9	1

1/ Excludes Belgium-Luxembourg.

Source: Appendix table 6.

Relative Feeding Value of Wheat

U.S. Feeding Experiments

The feeding value of wheat, as indicated by experiments carried out in the United States, was above that of corn, barley, oats, grain sorghum, and rye for all classes of livestock except fattening lambs (table 10). Feeding experiments resulted in rating corn next to wheat as the most favorable grain for most types of livestock. However, barley and grain sorghum were rated on a par with corn for dairy cows--that is, with a feed value about 5 percent below that of wheat. Both corn and grain sorghum were valued nearly 18 percent above wheat as a feed for fattening lambs.

41/ During 1955-1959, an average of 1.9 million tons of wheat and rye were fed to livestock annually in the United States. The percentage distribution by species of livestock was as follows: cattle, 7 percent; hogs, 20 percent; poultry, 63 percent; other livestock (including unallocated wheat), 10 percent. Wheat and rye jointly accounted for less than 2 percent of total grains fed to livestock during 1955-59 (37, pp. 44,49).

Table 10.--United States: Relative feeding value of grains for various types of livestock

(Wheat equal to 100)

Type of grain	Relative feeding value compared with wheat 1/				
	Poultry	Hogs	Dairy cows	Fattening cattle	Fattening lambs
	Percent				
Corn	95.2	97.1	95.2	95.2	117.6
Barley	76.2	87.4	95.2	83.8	102.4
Oats	85.7	87.4	85.7	81.0	94.1
Grain sorghum	90.5	87.4	95.2	87.6	117.6
Rye	---	77.7	85.7	90.5	100.0

1/ When fed in fairly well balanced rations.

Source: (37)

As indicated earlier, hogs and poultry were the major grain consuming types of livestock in the Community. In U.S. experiments, barley, oats, and grain sorghum were all rated 13 percent below the value of wheat when fed to hogs. The relative feeding value of grains shows much more variation for poultry. Corn and grain sorghum more nearly approached the value of wheat--5 percent and 10 percent less valuable, respectively--than oats and barley. Feeding tests for poultry placed the nutritive value of oats about 14 percent below that of wheat, compared with a 24-percent discount for barley.

German Feeding Experiments

Kellner and Becker rated corn, grain sorghum, and rye much higher in their relative feed value for hogs and dairy cows than did U.S. tests (table 11)(43). The relative feeding value of barley was computed at about the same level as in U.S. tests. On the other hand, oats were shown to be significantly below U.S. values. Richter appeared to arrive at about the same relative feeding values as did Kellner and Becker (60).

The different results of U. S. and West German tests were attributed by Farnsworth and Friedmann in part to dissimilarities in the qualities of the grains used for the basic experiments and in the methodology applied in the experiments (24, p. 102). However, it was also pointed out that both U.S. and West German feed value ratios of corn to wheat and corn to barley were much higher than corresponding price ratios for British imports of these grains in the last decade.

Table 11.--West Germany: Relative value of grains for hogs and cattle

(Wheat equal to 100)

Type of grain	Kellner-Becker				Richter			
	Hogs		Dairy cows		Hogs		Cattle	
	"Gesamtnahrstoff" 1/	Relative feeding value	"Starkeeinheiten" 2/	Relative feeding value	"Gesamtnahrstoff" 1/	Relative feeding value	"Starkeeinheiten" 2/	Relative feeding value
	Percent	Index	Units	Index	Percent	Index	Units	Index
Wheat (average quality)	78.5	100	74.8	100	79	100	75	100
Corn	80.8	103	82.0	110	81	101	83	111
Barley (average quality)	70.1	89	71.4	95	70	88	71	95
Oats (average quality)	63.0	80	56.7	76	63	79	63	84
Grain sorghum	75.8	97	75.6	101	N/A	N/A	N/A	N/A
Rye (average quality)	76.8	98	74.1 3/	99	77	96	74	99

1/ A concept similar to "total digestible nutrients."
2/ "Starkeeinheiten" means "starch units" which is similar to net energy or caloric value.
3/ Average quality feed rye.

Source: (43, 60).

Bergmann has calculated estimates of the relative feeding value of coarse grains for cattle and hogs assuming various prices of wheat (table 12) (2). For example, when the on-farm price of wheat was placed at $100 per metric ton, the cattle farmer would be equally well-off in terms of feed costs to purchase a ton of rye at $98.50, barley at $94.50, oats at $84.00, or corn at $100.50. For the hog farmer to be equally well-off in terms of feed costs,(when the on-farm price of wheat is $100 per ton) the on-farm price of coarse grains would have to be at a lower level per ton than for cattle, namely; rye, $96.00; barley, $87.00; oats, $79.00; corn, $101.00. This was due to differences in the availability of grain starch units to cattle and hogs and to price adjustments in the protein content of grain for hogs. The comparisons assumed grains of equal moisture content and amounts of impurities. Implicit in the assumptions were the concepts of good feeding practices.

Attitudes on Wheat for Feed

There is little information available for the EEC on farmer and feed manufacturer attitudes concerning the use of wheat in livestock rations. However, it appeared that, traditionally, farmers have disfavored using wheat for feed or have limited wheat to a rather small part of the ration. This apparent attitude on the part of farmers to feed wheat may have resulted in less wheat used by mixed feed manufacturers, especially where an "open formula" policy was common.

Bergmann pointed out--without explanation--that the use of bread grains for feed has always encountered a certain resistance in the Community (2,p. 15). Also, the relatively favorable nutritive value of wheat compared with that of feed grains was not generally known or appreciated by Community farmers. According to Bergmann, until knowledge of relative feeding values of grains and grain price relationship becomes more widespread, the impact of wheat feeding on the commercial grain market will be minor. However, implementation of a common price policy--with price adjusted to reflect transportation costs--was viewed as a positive device for promoting economic realism among farmers and feed manufacturers in the use of soft wheat for feed.

In response to an inquiry, Dr. P. W. H. Weightman stated:

> With regard to your question on the feeding of wheat to livestock in the EEC, at this time I can answer that feed compounders and most farmers are reluctant to include more than 10 percent wheat in rations to cattle and pigs. Higher proportions of ground or crushed whole wheat are believed to produce unfavorable results. Higher percentages (sometimes between 40 and 60 percent) of pollard and tailings are sometimes fed to hogs. Cooked flaked wheat is regarded as comparable to corn and fed similarly. It appears that the feeding practices in regard to wheat are based more on experience than on the results of research in this area. 42/

42/ Communication from Paul W. H. Weightman, University of New Castle Upon Tyne, England, February 18, 1969.

Table 12: Digestible protein, starch units, and relative value of grains for cattle and hogs compared with various prices of wheat 1/

Item	Digestible protein	Starch	Rating	Equivalent price of other grains when dollar price per metric ton of wheat is -- 2,3/						
	Percent	Units	Index	- - - - - - - - Dollars - - - - - - - - -						
Cattle 4/										
Wheat	9.2	75	100	85.00	90.00	95.00	100.00	105.00	110.00	115.00
Rye	7.4	74	99	84.00	88.75	93.75	98.50	103.75	108.75	113.50
Barley	8.0	71	95	80.50	85.25	90.00	94.50	99.75	104.25	108.75
Oats	8.6	63	84	71.25	75.50	79.75	84.00	88.25	92.50	96.50
Corn	7.5	83	111	94.00	99.75	105.00	110.50	116.25	121.75	127.25
Hogs 5/										
Wheat	10.2	79	100	85.00	90.00	95.00	100.00	105.00	110.00	115.00
Rye	7.6	77	96	81.50	86.25	91.25	96.00	101.00	105.75	110.25
Barley	8.3	70	88	74.25	78.00	82.80	87.00	91.75	96.25	100.50
Oats	8.9	63	79	67.00	71.00	74.75	79.00	83.25	87.00	91.00
Corn	7.9	81	101	85.75	90.75	96.00	101.00	106.00	111.25	116.25

1/ All grains adjusted to the same degree of moisture and amount of impurities.

2/ Prices are at the farm level.

3/ Prices converted at the rate of 4 deutsche marks equal to $1.00.

4/ Only starch units are taken into account since in Germany there is usually no shortage of plant protein for the feeding of cattle and it can be bought at the same price as starch.

5/ The equivalent prices have been adjusted to reflect differences in the digestible protein of the various grains since protein levels are relatively important in hog raising.

Source: Adapted from (2).

Paul Danyluk provided the following statement on an inquiry as to the attitudes of Italian farmers and manufacturers on wheat for feed:

> Regarding farmer attitudes on feeding wheat, there are no data on this subject. Some Italian literature, however, points out that many farmers feed low quality or partly damaged grain, such as shrunken, damaged by water or leftovers from previous crops. They further point out that wheat is deficient in many elements such as sodium, calcium, iodine and other minerals and also due to the unbalanced ratio between calcium and phosphorous there is a deficiency of Vitamin D which if not corrected (as in mixed feeds) causes rachitis. Wheat, due to its high protein content, performs well in poultry feed. In other cases wheat is a good substitute for other grains but it must be ground and mixed in proper proportions to serve a useful purpose.43/

Data supplied by David Riggs44/ suggests that Dutch farmers feed what the extension agents and nutritionists employed by feed manufacturers recommend. The maximum amount of wheat recommended in concentrates is 20 percent for cattle, pigs, and broilers and 10 percent for laying hens.

Farmer and feed manufacturer use of denatured wheat in West Germany has fallen below expected levels. According to George Parks:

> Despite the improved conditions favoring the use of denatured wheat, and despite two record crops in succession, the German feed manufacturer's appetite for denatured wheat has not been as great as originally anticipated . . . . . One reason for this relatively small amount of denatured wheat is the fact that the German mixing industry and farmers are not (or not yet) well accustomed to the use of denatured wheat . . . . . German experts believe that theoretically up to 50 percent of the corn could be replaced by wheat 45/

Even in France--the primary user of wheat for feed among the Common Market countries--little appears to be known about farmer attitudes on feeding wheat. Mr Dauphin has stated: "Concerning farmers' reactions, as regards the use of wheat for animal feed, no study has been made, at least to my knowledge." 46/ However, Mr. Dauphin went on to say "As regards total wheat utilized by producers of livestock feed, it varies essentially as a function of availability of other coarse grains for use in the formula and especially of their price."

43/ Communication from A. Paul Danyluk, U.S. Assistant Agricultural Attache to Italy, May 9, 1969.

44/ Communication from David W. Riggs, U.S. Assistant Agricultural Attache to the Netherlands, May 21, 1969.

45/ Communication from George A. Parks, U.S. Agricultural Attache to West Germany, March 28, 1969.

46/ Communication from Mr. Dauphin, Assistant Director, O.N.I.C. (Office National Interprofessionnel des Cereales) to Thomas E. Street, U.S. Agricultural Attache to France, May 6, 1969.

Relation Between Quality and Feed Use of Wheat

Some individuals(53, p. 9)have hypothesized that the quality of wheat influenced the quantity of wheat used for feed (the implication was that the lower the quality, the more wheat used for feed). This expectation seems reasonable, but it was not supported by preliminary investigations.47/

The first step in this analysis was to construct a "quality scale" for wheat based on (1) moisture, (2) weight, and (3) foreign grain, various impurities, and sprouted grain of the wheat harvest. An aggregate scale ranging from a low of "3" to a high of "15" was constructed (table 13). Each of the three components of the scale was weighted equally.

A quality index of wheat was constructed only for West Germany and France (table 14). However, these two countries accounted for over 97 percent of the direct on-farm consumption of wheat for feed in 1966/67. Information available for constructing the quality index was more complete for West Germany than for France. However, the quality index constructed for each country moved in the same general directions--a phenomena expected in line with a general weather pattern for Northern Europe.

Table 13.--Construction of a "quality scale" for wheat harvested in West Germany

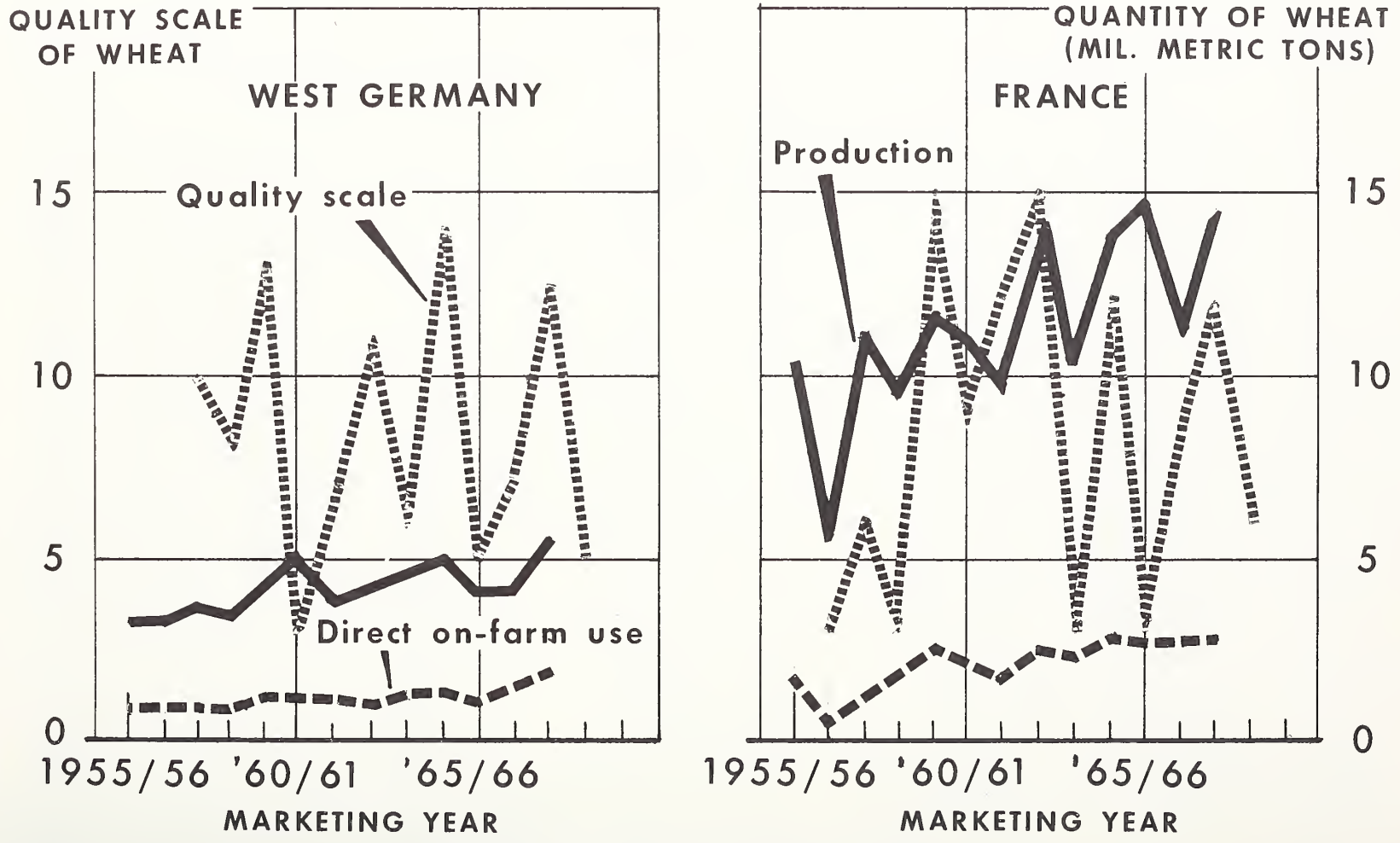
Moisture		Weight		Foreign grain various impurities, and sprouted grain		Aggregate scale
Percent	Scale	Kilograms per hectoliter	Scale	Percent	Scale	
16.0 & under	5	76.1+	5	4.0 & under	5	15
16.1-17.0	4	75.1-76	4	4.1-6.0	4	12
17.1-18.0	3	74.1-75	3	6.1-7.0	3	9
18.1-19.0	2	73.1-74	2	7.1-8.0	2	6
19.1+	1	73 & under	1	8.1+	1	3

Source: Constructed from appendix table 8.

Trends in wheat production and direct on-farm use of wheat for feed in West Germany and France were plotted against the quality index (figure 2). With few exceptions, the quantity of wheat used directly for feed was high when the quality was good (index was high) and low when the quality was poor (index was low). Changes in the quantity of wheat used for feed, however, were less pronounced than changes in the quality scale. The general situation was that good weather conditions--indicated by a "high" quality scale--resulted in a larger output of wheat with more wheat being used as feed.

47/ It would also be reasonable to expect that, other things equal, lower quality wheat could result in a lower producer price, assuming policies permitting some price flexibility.

"QUALITY", PRODUCTION, AND DIRECT ON-FARM USE OF WHEAT FOR FEED, WEST GERMANY AND FRANCE



SOURCE: TABLE 14 AND APPENDIX TABLE 3.

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Figure 2
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Table 14.--"Quality" of wheat harvested in West Germany and France, 1955/56 - 1968/69

Year	Country	
	West Germany	France
	Scale	
1955/56	N/A	N/A
1956/57	N/A	3
1957/58	10	6
1958/59	8	3
1959/60	13	15
1960/61	3	9
1961/62	7	12
1962/63	11	15
1963/64	6	3
1964/65	14	12
1965/66	5	3
1966/67	7	9
1967/68	12	12
1968/69	5	6

Source: Constructed from table 13, appendix tables 8 and 9.

Costs of Exporting or Denaturing Wheat

Two alternatives which Community member countries (primarily France) have employed in disposing of surplus soft wheat were denaturing for feed and exporting. Both alternatives required a subsidy. High support prices for wheat required that it be subsidized to be competitive with feed grains in domestic markets or with other wheat in world markets.[48/] Disposing of agricultural surpluses represented a burdensome expenditure for the Community. Thus, the EEC was interested in a surplus disposal policy for wheat which would minimize costs to the Agricultural Fund.[49/] This action could have a significant impact on the level of feed grain import requirements.

Levies collected on imports of wheat and feed grains have been used in financing the CAP. When wheat was denatured and used for feed, the Community lost the levy on feed grain imports displaced by denatured wheat. It also bore the cost of the denaturing subsidy. Of course, at the same time, the

48/ Provisions are also made for exporting denatured wheat which would need to be competitive with feed grains.

49/ This is not to imply that cost consideration would necessarily outweigh other policy aspects of trade with nonmember countries.

EEC avoided the cost of the export subsidy which would have been required to move the wheat into the world market. Since the Community is deficit in feed grains--and is expected to remain deficit through 1975--denatured wheat would not require compensating feed grain exports. 50/

Schertz explained the relative costs associated with denaturing or exporting surplus soft wheat as follows:

Denaturing wheat (F):

Denaturing payment (D) = $C_w - C_g + a_1$

Feed grain levy (L) = $C_g - W_g + a_2$

Exporting wheat (E):

Export subsidy (S) = $C_w - W_w + a_3$

C_w and C_g are, respectively, the EEC prices of wheat and feed grains; W_w and W_g are the world market prices of the respective commodities; and a_1, a_2, and a_3 are other cost factors. Since F = D + L, the cost of denaturing reduces to (F) = $C_w - W_g + a_1 + a_2$ (66, p. 18).

The analysis by Schertz demonstrated that the EEC was not in a position to affect the alternative costs of exporting or denaturing wheat (this is not to say that they could not react to conditions created by others). With the aid of tabular information similar to that presented in table 15, it was shown that a raising or lowering of wheat prices by the EEC would equally affect the exporting cost and the denaturing costs. For example, if the wheat price were increased by $2.00 per metric ton, both the export subsidy for wheat and the denaturing premium for wheat would need to be increased by $2.00. Raising feed grain prices in the EEC would permit a lowering of the wheat denaturing premium and also reduce by the same amount the levy receipt from feed grains. On the other hand, world market prices of grain can influence the EEC's relative costs of exporting or denaturing wheat. For example, an increase in world wheat prices would lower export costs (reduced export subsidies), but have no effect on denaturing costs. A decline in world feed grain prices would raise denaturing costs by raising the import levy on feed grains but have no effect on wheat exporting costs. Thus, the decision by the EEC to export or denature surplus soft wheat may be influenced by the price relationship between wheat and feed grains on world markets.

The data presented in table 15 provide an October 1969 estimate of the relative costs of exporting wheat or denaturing wheat for feed. Depressed world wheat prices required that the EEC apply large export subsidies to make its wheat competitive. The result was that costs were lower for denaturing

50/ The IFO-Institut fur Wirtschaftsforschung (38) placed the EEC's total net grain imports at 11 million metric tons in 1975. Sorenson and Hathaway (73, p. 108) projected EEC grain trade for 1975 as follows: food grains--net exports of 14.5 million metric tons' feed grains--net imports of 25.7 million metric tons; total grains--net imports of 11.2 million metric tons.

wheat than for exporting wheat and large quantities of soft wheat were moved into feed use.

Table 15.--Relative costs of exporting or denaturing wheat for feed in the EEC, October 1969

Item	Total cost of	
	Exporting wheat	Denaturing wheat
	- - - - $ per metric ton - - - - -	
Denaturing payment for wheat	----	19.17 1/
Export subsidy for wheat	66.93 2/	---
Levy receipt for feed grains	---	42.67 3/
Total	66.93	61.84

1/ Unweighted average of the denaturing ($19.67) and admixing ($18.67) premium for October 1969.

2/ Estimate based on nondurum wheat import levy of $56.93 October 1969 plus $10, an approximatation of additional freight allowances.

3/ Unweighted average of import levies on corn ($45.24), barley ($48.79) and grain sorghum ($33.98).

Source: Adapted from (66).

DOMESTIC DEMAND FOR FEED WHEAT

Factors Influencing the Quantity of Wheat Used for Feed

The major proportion of the EEC's use of wheat is as food--accounting for some 70-75 percent of total yearly disappearance. Seed, industrial use, and losses account for 5 to 10 percent. Food use of wheat for the whole of the EEC apparently leveled off at around 20 million metric tons and combined seed and industrial uses of wheat have stabilized near 2 million tons. Feed use was about 20 percent of total wheat utilization.

Export and stock adjustments, in addition to domestic uses, are other ways of handling the Community's annual wheat supplies. EEC exports of wheat fluctuated substantially from year-to-year during 1955/56 - 1966/67. Despite a general rise in the EEC's soft wheat exports, growth appeared to level off in the 1964/65 - 1966/67 period. Stocks of wheat also varied from year-to-year in the EEC, but generally held around 6 million metric tons (between 1955/56 and 1965/66, stocks ranged from 5.4 to 8.2 million metric tons).

The continued increases in production of soft wheat in the EEC, concurrent with the availability of large quantities of wheat on world markets and the continued feed grain deficit in the EEC, has diverted larger quantities of soft wheat into feed use.

The following equation shows the relationship hypothesized for the domestic demand of wheat for feed:

$$C_t = a + b_1 P_t^w + b_2 P_t^{cg} + b_3 L_t^u + b_4 P_t^{uk} + b_5 T$$

where:

C_t = total domestic demand for soft wheat for livestock feed, thousand metric tons.

P_t^w = average price of soft wheat received by farmers, dollars per metric tons.

P_t^{cg} = weighted average price of coarse grains received by farmers, expressed as an index with 1955/56 - 1957/58 = 100.

L_t^u = the number of livestock units in the first year of the split year period (e.g., 1955 for 1955/56), in thousand units.

P_t^{uk} = the United Kingdom's average c.i.f. price of all wheat (except denatured wheat), British pounds per long ton.

T = a trend factor serving as a composite of factors affecting the use of soft wheat for feed but not specifically included in the analysis with 1955/56 = 56, 1956/57 = 57, etc.

Direct on-farm use of soft wheat for feed and the use of soft wheat for feed from commercial channels were combined under the same demand function. Historically, direct on-farm use of wheat for feed was much more important than through commercial channels, especially in France and West Germany, the EEC's major users of feed wheat. Circumstances contributing to this phenomena may or may not persist in the future.

The price of wheat at the farm was selected as an important variable influencing farmer decisions to market wheat directly or indirectly through feeding to livestock. It was expected that

$$\frac{\Delta C_t}{\Delta P_t^w} < 0 \text{ (i.e., negative)}$$

Price supports for wheat prevented extreme price fluctuations throughout the year (outside of staged increases during the marketing year to allow for insurance and storage costs to promote orderly marketing).[51/] Prices were restricted to soft wheat which was supported at a lower price than durum and, unlike durum, was in surplus production in the Community.

51/ Price supports were implemented at the wholesale level.

Other farm-produced grains are competitive with wheat as a livestock feed grain. The use of wheat for feed should have increased as coarse grain prices more closely approximated wheat prices. Consequently, it was expected that

$$\frac{\Delta C_t}{\Delta P_t^{cg}} > 0 \text{ (i.e., positive)}$$

Rye, barley, and oats represented domestically produced coarse grain substitutes for soft wheat in all member countries. Corn was also included for France and Italy since these two countries were the only significant producers of corn for grain in the Community. An index of farm prices of coarse grains was constructed with 1955/56 - 1957/58 = 100 (table 16).

Consideration was given to using wholesale grain prices, rather than producer prices, as the price variable influencing the commercial use of wheat for feed. However, in some cases reported wholesale prices were below producer prices for comparable types of grain. Unlike producer prices, wholesale prices were often for a particular location within the country.52/

Table 16.--Indices of coarse grain prices, EEC member countries, 1955/56 - 1966/67 1/

Year	West Germany	France	Italy	Netherlands	Belgium-Luxembourg
	Index 1955/56 - 1957/58 = 100 2/				
1955/56	100.3	n.a.	111.9	95.2	99.7
1956/57	98.5	103.7	104.3	98.7	105.1
1957/58	101.2	96.3	83.7	106.1	95.2
1958/59	101.7	92.5	86.6	107.3	121.3
1959/60	101.9	100.0	96.6	122.7	127.4
1960/61	99.1	98.3	98.3	96.1	109.5
1961/62	106.0	102.2	85.0	123.9	129.8
1962/63	108.9	114.9	98.3	123.1	127.5
1963/64	107.7	101.9	100.3	122.5	124.0
1964/65	110.5	105.7	104.6	133.2	128.7
1965/66	110.4	114.3	106.7	141.0	133.8
1966/67	109.6	119.6	105.9	139.0	134.8

1/ Based on a 3-year average of weighted average prices of coarse grains (rye, barley, and oats for all member countries, but also including corn for France and Italy).

2/ 1956/57 - 1957/58 for France.

Source: Computed from data in appendix tables 10 and 11.

52/ Prior to the 1964 grain market regulation, the Community used some soft wheat imports for feed. This usage would presumably be included in commercial sales of wheat for feed. The levy system implemented by the EEC, with its high threshold price, has essentially stopped imports of wheat for feed from third countries.

Data were not available concerning what proportion of the wheat used for feed from commercial channels was incorporated into commercial mixed feeds, or merely purchased from farmers by local dealers and resold to them or other farmers according to the farmers own prescribed feeding mix (or possibly as whole grain). Butterwick and Neville Rolfe indicated that cooperative feed plants in the Netherlands generally purchased grain from the farmer and sold commercially prepared formula feeds to him (5, p.11).53/

The number of livestock fed annually affected total feed utilization for that year. Various species of livestock were converted to a standard livestock unit (table 17). Grain consuming animal units were not separated from all livestock because of lack of data. The relationship expected between wheat used as feed and number of livestock units was

$$\frac{\Delta C_t}{\Delta L_t^u} > 0$$

All member countries of the EEC exported wheat each year during the time period under analysis. Exports from France exceeded those of all other member countries combined. It was expected that the price of wheat in world markets had the following relationship to wheat used for feed from commmercial markets:

$$\frac{\Delta C_t}{\Delta P_t^{uk}} < 0$$

National policies were probably adjusted to place less emphasis on moving wheat into feed use when prices in export markets were at a relatively high level. The United Kingdom's c.i.f. price of wheat imports was selected as an indicator of world prices of wheat. Data on export subsidies were not available for the time period under analysis.

Farmer attitudes and knowledge of feeding wheat, feed manufacturers increased familiarity with using wheat in mixed feed, and Government policies not implicit in previous specified variables were either nonquantifiable or data were not available. Since these factors were considered important and may be a source of continuous systematic variation, they were introduced into the analysis in the form of a time variable.

Time series data on denaturing premiums were available for France for 1955/56 - 1966/67. Sales of denatured wheat did not occur in Italy until the 1968/69 crop.54/ The denaturing program in West Germany began in 1967/68.55/ Since France was the only major surplus producer of soft wheat in the EEC, it

53/ The EEC produced 21.3 million tons of mixed feed in 1965, compared with 9.7 in 1958. Production in 1965 by type of livestock was (in million tons): Poultry--8.1; hogs--7.0; cattle and calves--5.5; and other animals--0.7. Individual member countries in 1965 produced (in million tons): West Germany--6.6; Netherlands--5.6; France--4.6; Belgium-Luxembourg--2.5; and Italy--2.0.

54/ Communication from A. Paul Danyluk, May 9, 1969.

55/ Communication from George A. Parks, March 28, 1969. The only other denaturing of wheat was in 1964 when minor quantities were sold by the German Import and Storage Agency.

Table 17.--Animal numbers in terms of livestock units, EEC and individual member countries, 1955-67 1/

Year	EEC	West Germany	France 2/	Italy 2/	Netherlands	Belgium-Luxembourg 3/
	1,000 livestock units (L.U.)					
1955 4/	49,141	13,746	19,232	10,322	3,255	2,586
1956	52,683	14,280	21,565	10,946	3,285	2,607
1957	53,919	14,574	22,145	11,104	3,396	2,700
1958	54,675	14,440	22,611	11,381	3,486	2,757
1959	55,572	14,592	22,768	11,683	3,680	2,849
1960	57,067	15,002	23,420	12,067	3,745	2,833
1961	58,880	15,513	24,277	12,157	3,946	2,987
1962	58,096	15,438	23,816	11,734	4,080	3,028
1963	55,695	15,153	22,750	11,213	3,777	2,803
1964	56,505	15,308	22,656	11,755	3,937	2,849
1965	57,509	15,668	22,899	11,841	4,153	2,948
1966	58,548	15,903	23,457	11,952	4,249 5/	2,987
1967	59,434	16,198	23,629	12,158	4,399 5/	3,050

1/ The conversion factors used are as follows:

Cattle under 1 year of age:	0.4 L.U.
Breeding cattle 1 year and over:	1.0 L.U.
Cattle for fattening 1 year and over:	1.2 L.U.
Sows of 6 months and over:	0.3 L.U.
Other hogs:	0.2 L.U.
Sheep and goats:	0.1 L.U.
Chickens:	0.004 L.U.
Horses:	1.0 L.U.
Mules, donkeys:	0.9 L.U.

2/ France revised its series on cattle beginning in 1961 and Italy revised its series on cattle beginning in 1965.

3/ Belgium revised its series on livestock and poultry numbers beginning in 1960.

4/ Not strictly comparable with later years because of modifications in conversion ratios beginning in 1956.

5/ Estimated by the Statistical Office of the European Community.

Source: Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 7, 1966, No. 8, 1967; No. 7, 1968.

was expected that wheat disposal programs would be of most concern in that country. The Community, in setting grain prices, was concerned that too high a price for wheat relative to feed grains could result in less direct on-farm consumption of wheat or that a large denaturing premium could result in a substitution of denatured wheat for direct on-farm use of wheat.

Table 18.--C.I.F. price of United Kingdom wheat imports, 1955/56 - 1967/68

Year	Price
	- - British pounds per long ton - -
1955/56	27.54
1956/57	29.14
1957/58	25.27
1958/59	25.35
1959/60	25.55
1960/61	25.44
1961/62	26.14
1962/63	26.43
1963/64	26.68
1964/65	27.03
1965/66	26.38
1966/67	27.49
1967/68	28.31

Source: Appendix table 13.

Statistical Computations, Tests, and Results of Analysis

The purpose of the multiple linear regression analysis was to establish functional relationships and to obtain forecasts. This led to the computation of the following items for each regression equation:

1. The X_o coefficient or constant term.
2. Standard error of estimate.
3. R^2 -- the coefficient of multiple determination.
4. The regression coefficients and their standard errors.
5. The t statistic for testing the hypothesis $b_i = 0$.
6. The F statistic for testing the hypothesis $R^2 = 0$.

Equations were fitted for each of the EEC countries (Belgium-Luxembourg combined) using annual data for 12 years (1955/56 - 1966/67). The computed values, their standard errors, and the coefficients of multiple determination are in table 19.

The regression coefficient for price of wheat received by farmers was negative, as expected, in the equations for France, Italy, and the Netherlands.

In the equations for West Germany and Belgium-Luxembourg, the sign of the regression coefficient was positive. Vigen obtained positive coefficients for the wheat price variable in his study in four of the EEC countries and hypothesized at least two situations under which positive coefficients might appear (83, p.70). One possible explanation offered was that the price of feed grains increased relative to the price of wheat during the period of analysis. Since wheat and feed grains are technical substitutes, an increase in the price of feed grains relative to that of wheat could result in an increased quantity of wheat used for feed because of the change in the slope of the isocost curve. A comparison of price data used in this study indicated that coarse grain price in West Germany and Belgium-Luxembourg increased at a faster pace than did wheat prices.

The second situation posed by Vigen was one in which the price of animal products increased, raising the marginal value product (MVP) of wheat used in livestock feeding. This would tend to increase the feed demand for both wheat and coarse grains. While the price of slaughter cattle, slaughter hogs, and milk increased in West Germany and Belgium-Luxembourg during the period of analysis in this study, these prices also increased in other member countries as well.

The coefficients relating to the wheat price received by farmers was found significantly different from zero at the 5-percent level for Italy and the 1-percent level for Belgium-Luxembourg.

Regression coefficients relating to coarse grain prices were not significant at the 5-percent level in any of the equations. Again the equations for France, Italy, and the Netherlands yielded regression coefficients (positive) which were expected while coefficients for West Germany and Belgium-Luxembourg were the opposite of those expected. The high degree of intercorrelation between the wheat price and the coarse grain price may have influenced the sign of the coefficient for West Germany (table 20).

The coefficient relating to livestock units was expected to be significant in the wheat fed equation of each Community member. However, none of the regression coefficients were significant at the 5-percent level. Further, the equations for France and Italy did not yield the positive correlation which was expected between use of wheat for feed and livestock units. There was no clear rationale as to why this negative relationship should exist. Perhaps the livestock enterprise which was developing most rapidly in France and Italy tended to use less wheat in feeding rations than did the most rapidly growing livestock enterprise of other member countries. Also, the development of large commercial beef and poultry operations in Italy may have resulted in increased dependence on a more reliable world supply of coarse grains, particularly corn, and less dependence on domestic supplies of soft wheat.

Regression coefficients relating to the c.i.f. price of wheat in the United Kingdom and use of wheat for feed in EEC countries were negative, as expected, in all countries. The coefficient for the Netherlands was significant at the 5-percent level and the coefficient for Belgium-Luxembourg was significant at the 1-percent level.

Table 19.--Least squares estimate of coefficients, standard errors, and coefficient of multiple determination of demand for wheat for feed equations

Country	X_0	Wheat price received by farmers (dollars per metric ton) X_1	Coarse grain prices received by farmers (index 1955/56-1957/58 = 100) X_2	Livestock units (in thousands) X_3	CIF price of wheat in UK (pounds per long ton) X_4	Trend factor X_5	R^2
France	0.146	-44.658 (47.643)	46.323 (30.765)	-289.573 (160.181)	-153.126 (444.214)	167.400 (82.473)	.83*
West Germany	-0.253	55.695 (40.428)	-47.993 (40.028)	228.269 (141.362)	-31.411 (33.327)	12.992 (35.733)	.79**
Italy	0.229	-15.049** (4.143)	1.309 (1.848)	-43.587 (39.150)	-17.219 (13.479)	4.409 (5.643)	.64
Netherlands	0.160	-15.963 (22.564)	2.845 (6.246)	0.190 (0.523)	-78.904** (34.498)	16.367 (105.115)	.41
Belgium-Luxembourg	0.545	7.203* (1.828)	-0.273 (0.668)	0.031 (0.067)	-23.188* (4.324)	-9.721* (2.547)	.88

* Significant at the 1-percent level.
** Significant at the 5-percent level. Numbers in parenthesis are standard errors.

Source: Computed.

Table 20.--Estimate of simple correlation coefficients for all variables in demand for wheat for feed equations for each EEC country

	West Germany	France	Italy	Netherlands	Belgium Luxembourg
C_t, X_1	0.759	-0.490	-0.813	-0.313	-0.091
C_t, X_2	0.716	0.488	-0.355	-0.188	-0.506
C_t, X_3	0.879	0.426	0.160	-0.076	-0.367
C_t, X_4	-0.323	-0.386	-0.495	-0.654	-0.564
C_t, X_5	0.827	0.780	-0.101	-0.239	-0.625
X_1, X_2	0.975	0.388	0.535	0.905	0.399
X_1, X_3	0.789	-0.353	-0.318	0.888	0.262
X_1, X_4	-0.037	0.953	0.465	-0.003	0.244
X_1, X_5	0.878	-0.119	0.161	0.980	0.483
X_2, X_3	0.809	0.328	-0.257	0.868	0.840
X_2, X_4	0.042	0.411	0.678	-0.021	-0.075
X_2, X_5	0.903	0.729	0.223	0.894	0.839
X_3, X_4	-0.123	-0.403	-0.387	-0.112	-0.295
X_3, X_5	0.929	0.650	0.703	0.947	0.814
X_4, X_5	-0.034	-0.034	-0.034	-0.034	-0.034

where: C_t, Total domestic wheat used for feed, thousand metric tons.

X_1, Average price received by farmers for soft wheat, dollars per metric ton.

X_2, Coarse grain prices received by farmers, 1955/56 - 1957/58 = 100.

X_3, Livestock units, in thousands.

X_4, C.I.F. price of wheat in the U.K., pounds per long ton.

X_5, Trend factor where 1955/56 = 56, 1956/57 = 57, etc.

Source: Computed

Belgium-Luxembourg was the only country where the trend factor was significantly different from 0 at either the 1-percent (Belgium-Luxembourg) or at the 5-percent level.

The coefficient of multiple determination (R^2) was at a relatively high level for France, West Germany, and Belgium-Luxembourg (table 19). However, slightly less than two-thirds of the variation in wheat used as feed in Italy

was explained by the variables included in the analysis. The situation was even less satisfactory in the Netherlands with the independent variables accounting for only two-fifths of the variation.

The hypothesis, $R^2 = 0$, was tested for each demand equation through the use of the F statistic. The coefficient of multiple determination for France was significantly different from 0 at the 1-percent level and for West Germany at the 5-percent level. Vigen found the coefficient of multiple determination for France significantly different from 0 at the 5-percent level and significantly different from 0 at the 1-percent level for the Netherlands (83, p.74).

The low R^2 shown for the Netherlands may be caused by several factors. Dutch farmers shifted away from the direct use of grains as such and into greater use of mixed feeds (57). This development will tend to lessen the relative importance of wheat and coarse grain producer prices in explaining the amount of wheat used for feed, particularly at the farm level. Use of grain substitutes--corn gluten, manioc, brewers grains, and so forth-- became of major importance in the Netherlands and competed with grains. Despite the increase in livestock numbers in the Netherlands, the use of grains in livestock feeds in that country declined.

Futher investigation of the functional relationship between the quantity of wheat used for feed and selected variables failed to yield any significantly improved results. The summary results for France--the EEC's major user of soft wheat for feed--of three additional hypothesized functions were as follows:

Function	Significant variables	R^2
$C_t = f(P^w_t, P^{uk}_t, P^{cg}_t)$	P^{w**}_t, P^{cg*}_t	.76
$C_t = f(P^w_t, P^{uk}_t, P^{cg}_t, L^u_t)$	P^{w**}_t, P^{cg*}_t	.75
$1/C_t = f(P^w_t, P^{cg}_t, L^u_t, P^1_{t-1}, T)$	P^{w*}_t	.85

* Significant at the 1-percent level.
** Significant at the 5-percent level.

1/ The P^1_{t-1} is producer price of pork with prices lagged 1 year. Poultry prices would have been preferred but data were not available.

The first and second hypothesized functions had several significant variables, but the R^2's were lower than obtained earlier (.83). The third hypothesized function had a slightly higher R^2. However, all three hypothesized functions gave a lower projection of French use of wheat for feed than seemed acceptable.

Wheat Prices

Farmers in the EEC exerted strong political pressure for higher wheat prices. On the other hand, the rising cost of surplus wheat disposal and market support received unfavorable attention and comment.56/

Common prices for grains (adjusted for differences in transportation costs) became effective throughout the Community on July 1, 1967. The highest target price for the most deficit area in the EEC--Duisburg, West Germany--was set at $106.25 per metric ton for wheat. This price has been maintained since that date.57/

West German and Italian wheat prices were the highest in the EEC during the 1955/56 - 1966/67 period (appendix table 11). France, producing one-half of the Community's wheat output, had the lowest producer prices. Although agreement was reached on common grain prices as early as December 1964, a common price for all countries was not implemented until July 1, 1967. During this time interval, France and the Netherlands increased their wheat prices which were below the agreed-to-common prices, while West Germany, Italy, and Luxembourg failed to lower their wheat prices which were above the agreed-to common prices. Belgium's wheat prices were already near to the common price.

The price changes for wheat, resulting from application of the common prices, were also greater in France than in other member countries. This was particularly true for the Paris Basin, France's most important and productive grain area. In addition, prior to the common wheat prices, French farmers paid a "quantum" tax which increased progressively with the size of wheat deliveries. This tax was eliminated under price harmonization and resulted in a further price increase to the French producer.

Changes in monetary parity ratios in the Common Market led to further uncertainty about future producer prices in individual member countries. Producer prices in West Germany declined 8.5 percent on October 18, 1969 (in terms of deutsche marks) but incomes were to be supported by direct payment for 4 years. Pressures may be exerted by farmers at the end of 4 years and bring about an extension of direct payments. At the same time, French agricultural prices are to be realigned with common prices by the start of the 1971/72 marketing season. This would result in a further 12.5 percent increase in the price of wheat--a commodity which has already experienced sharp price increases. French farm pressure may cause the price increases to be fully implemented before the expiration of 2 years despite the Community's surplus soft wheat situation.

56/ It is estimated that in 1968/69 FEOGA expenditures on grains (excluding rice) totaled $666 million out of a total cost of $2.4 billion (3).

57/ Despite this stability of the $106.25 target price, adjustments in the marketing regulations in defining the Community's deficit and surplus areas have resulted in increased target prices in some areas of the Community (particularly Bavaria in West Germany).

A detailed study of the Community's grain and livestock prices with projections to 1970 and 1975 was authored by Epp and published in 1968 (14, p.88-90). He concluded that complete adjustments to common grain prices by 1970[58/] would result in considerable uniformity of the producer price surface throughout the EEC. Producer wheat prices in EEC member countries were projected to change between 1960 (average of 1959, 1960 and 1961) and 1970 as follows: West Germany, -4 to -10 percent; Belgium and Italy, about constant; Netherlands, +17 percent; France, +20 to +24 percent. Barley prices for the same period were expected to decline 4-6 percent in West Germany with all other areas experiencing a marked increase. French corn prices were expected to rise 20-24 percent with prices in Italy increasing about 30 percent. The 1970 grain prices were then projected to 1975 with no change in prices as the low assumption and a 15.9 percent increase in prices for the high assumption (except for Italy where the increase was 11.9 percent). For most regions of the EEC, both 1970 and 1975 price projections resulted in a fall (below the reference period) in the ratio of wheat prices to barley and corn prices.

The 1967/68 grain support prices announced by the EEC were adjusted by Epp to arrive at producer prices for that period for 19 separate regions of the Community (14, p.122).[59/] Producer price levels estimated for 1967/68 were assumed unchanged for 1970 except for adjustments made as a result of transportation costs (14, p.122, 126).[60/] A low projection and a high projection were made for each grain for 1975. The low projection assumed that nominal prices would remain constant at the 1970 level. On the other hand, the high projection assumed a 3 percent yearly price increase between 1970 and 1975 or approximately a constant real price. The projections of wheat producer prices for the member countries--which for West Germany, Italy, and France are an arithmetic average of the regional price projections by Epp-- are presented in appendix table 14.

Community officials frequently have expressed distaste for production controls so there is little likelihood of a managed supply at higher support prices. At the same time, however, it is unlikely that the Community will make the desired progress in restructuring agriculture, and pressure will persist from farm groups for higher price supports to raise farmers' incomes.

Taking these various aspects into consideration, the high price projections by Epp probably will not be attained by 1975. Difficulty may also be experienced in holding wheat prices at the low projections. A 1-percent annual increase in wheat prices between 1970 and 1975 resulted in the following projections of producer prices for soft wheat in 1975 (rounded to the nearest dollar):

58/ Grain price harmonization, originally scheduled for 1970, was advanced to July 1, 1967.

59/ Support prices were adjusted to producer prices on the basis of the past ratio of producer prices to policy prices.

60/ With the elimination of barriers to trade between member nations, internal prices needed to be made consistent with transportation costs. The procedure for making this adjustment was to calculate the difference between the prices of each region and the region adjoining it and to adjust the two prices if the transportation costs between the two regions was smaller than the calculated price difference.

Country	$ per metric ton
West Germany	$102.00
France	99.00
Italy	112.00
Netherlands	103.00
Belgium-Luxembourg	103.00

Feed Grain Price Index

Unlike the price of soft wheat, the prices of coarse grains were twice increased from common prices first effective July 1, 1967 (table 21). Target prices for barley were raised over 4.5 percent ($4.19 per metric ton) between 1967/68 and 1969/70. Comparable increases for corn were nearly 6 percent or $5.31 per metric ton. The price of rye was increased 4 percent or $3.75 per metric ton even though rye is used extensively in West Germany as a food grain. These changes in coarse grain prices served at least four objectives: (1) farm incomes of grain producers were increased, (2) price incentives were provided to increase production of feed grains which were in deficit supply, (3) the new price ratio between wheat and feed grains better reflected relative feed values, and (4) increased protection was given to domestic coarse grain producers (through increased threshold prices).

As with wheat, Epp's projections for 1970 prices of barley, corn, and rye were the same as the 1967/68 crop. The low and high projection for 1975 followed the procedure used for wheat (14, p.127).61/

The EEC will probably continue to encourage the production of feed grains versus wheat. As a result, price adjustments effected between wheat and feed grains since 1967/68 will probably be continued to some extent. Producer prices for corn in 1975 were estimated to increase 2 percent annually from the 1970 price estimated by Epp (support prices for corn were increased 3 percent from the 1967/68 to 1969/70 marketing seasons) (14, p.90). The Community is deficient in corn which offers the keenest competition to indigenous grain production. A higher target price for corn would result in a higher minimum import (threshold) price, thereby offering indigenous grains more protection.

Producer prices for barley in 1975 are expected to increase at about the same rate as for corn and be equivalent to a 2-percent annual increase based on the 1970 producer price estimated by Epp (the support price for barley was increased 4 percent from 1967/68 to 1969/70) (14, p.89). However, the Community was near self-sufficiency in barley and will be less enthusiastic about increasing barley production than corn production.

Support prices for rye were increased 4 percent from 1967/68 to 1968/69. Some additional price increase is expected by 1975. As a consequence, producer prices for rye in 1975 are expected to be equivalent to a 2-percent annual increase in the 1970 prices estimated by Epp (14, p.91).

61/ Barley and corn price for Italy for 1975 were reportedly adjusted to reflect the 1972 expiration of the import subsidy.

Table 21.--Target, intervention, and threshold prices for grains, EEC, 1967/68 - 1969/70 1/

Grain	1967/68 Price			1968/69 Price			1969/70 Price		
	Target	Intervention	Threshold	Target	Intervention	Threshold	Target	Intervention	Threshold
	$ per metric ton								
Soft wheat	106.25	98.75	104.38	106.25	98.75	104.38	106.25	98.75	104.38
Durum wheat 2/	125.00	117.50	123.13	125.00	117.50	123.13	125.00	117.50	123.13
	145.00			145.00			145.00		
Barley	91.25	85.00	89.00	94.44	87.98	92.19	95.44	88.48	93.19
Corn	90.63	77.00	88.38	94.94	79.31	92.69	95.94	79.31	93.69
Rye	93.75	87.50	---	97.50	91.00	---	97.50	91.00	---
Grain sorghum	---	---	85.44	---	---	89.00	---	---	89.93

1/ Both target and intervention prices are basic prices.
2/ Producers are guaranteed a minimum price of $145 per metric ton.

Source: Europa House, Agra Europe, London, May 7, 1969, p. EN/1. Donald J. Novotny, "The Current EC Grain-Market Situation," Foreign Agriculture, Washington, U. S. Department of Agriculture 1969, pp. 7, 8, 12. European Community, Common Market Farm Report, Washington, Information Service, December 1967.

The oat prices, not projected by Epp, were assumed to remain in the same relationship to barley prices as an average of the 1964/65 - 1966/67 period (within each country).

These estimated coarse grain prices were weighted by the 1975 production estimates of each grain to construct an index of coarse grain price for 1975 (73, p. 81).[62] This resulted in a much closer soft wheat /coarse grain price ratio than existed in 1964/65 - 1966/67 (table 22). The result appeared to be in line with EEC objectives to promote feed grain production and deemphasize soft wheat production. Also, wheat was made much more attractive in price as a feed in all of the EEC member countries.

The wheat/feed grain price ratios projected for 1975 would significantly lessen the need for a denaturing premium for wheat.[63] Nevertheless, the use of denaturing subsidies are still expected in 1975. Some incentives other than wheat/feed grain market price relationships may still be required to move wheat into feed use.[64] Storage, transportation, and other costs acquired by wheat intervention agencies might need to be covered by a denaturing premium. In addition, there is the actual technical cost of denaturing.

Livestock Units

An aggregate projection to 1975 of total livestock units in the EEC was not available from other studies.

Total livestock units in each of the EEC countries increased since 1955 (figure 3), but the most rapid increase was in Holland (table 23). The greatest fluctuation in livestock units during the 1955-67 period occurred in France. A decline in total livestock units in 1963 in all countries was caused by forced slaughtering as a result of inadequate feed supplies (transportation of feeds was hampered by severe winter weather).

Projection of cow numbers and selected livestock products to 1975 were contained in both the Sorenson and Hathaway and the IFO studies (73, 38). Perhaps the largest difference in these two projections--in terms of livestock

62/ Projections of rye production alone are not provided in this report but were estimated from the more aggregative data which was available and from production trends in appendix table 10 and from U.S. Department of Agriculture, Indices of Agricultural Production in Western Europe, 1950-68, Washington, 1969.

63/ For example, in the Netherlands in 1969 wheat prices were reportedly subsidized to 10-15 percent below corn prices to promote wheat use in feed.

64/ The EEC denaturing and admixing premium for wheat for the 1970/71 marketing season were reduced by $3.00 per metric ton from the 1969/70 levels. Also, after January, no further monthly premium increases are to occur during the remainder of the marketing year.

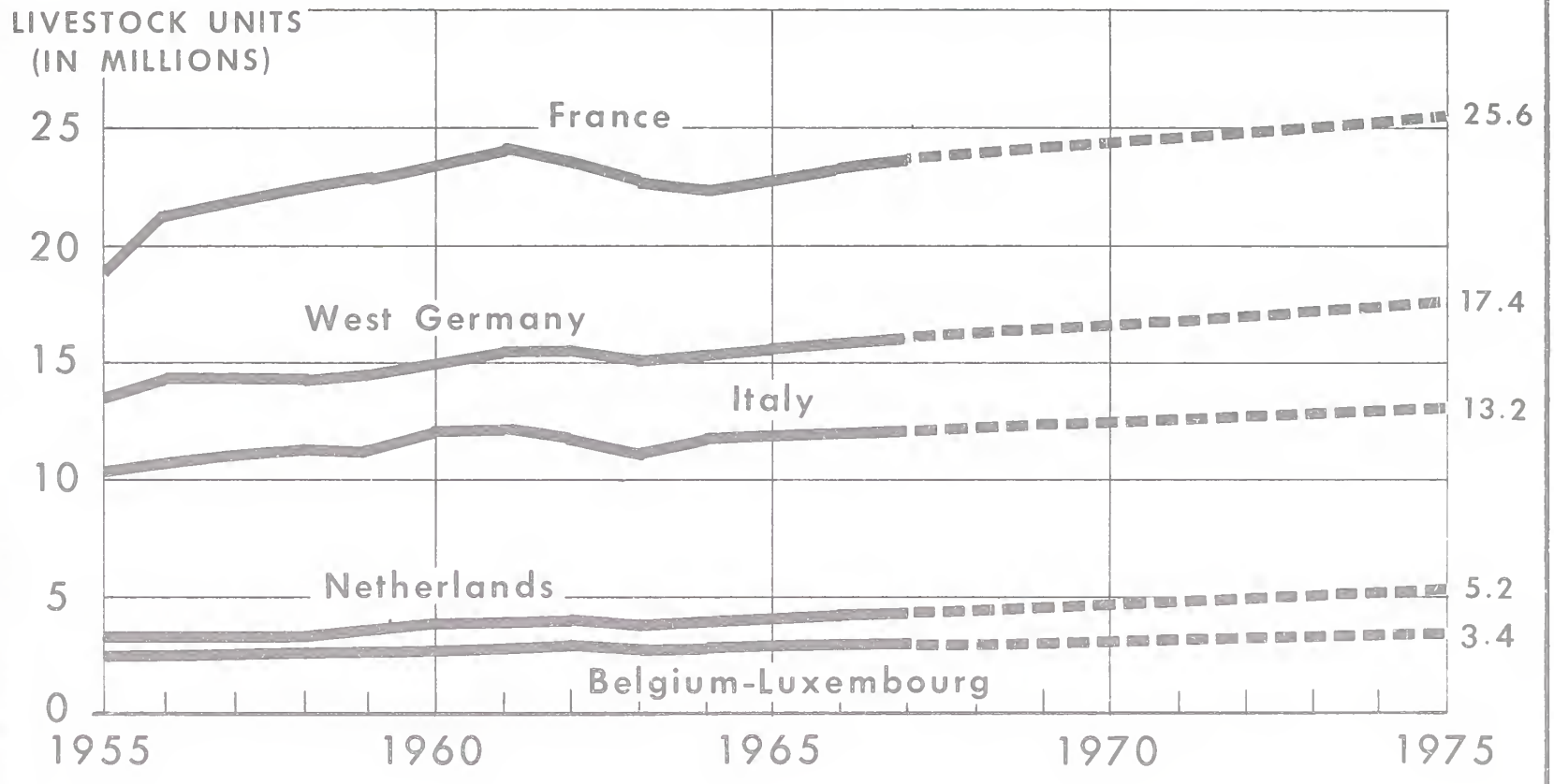
Table 22.--Projections to 1975 of coarse grain prices, coarse grain production, and the wheat/coarse grain price ratios with selected comparisons to 1964/65 - 1966/67, EEC member countries

Item	West Germany	France	Italy	Netherlands	Belgium-Luxembourg
Price ($ per metric ton)					
Corn	101 1/	101	104	---	---
Barley	98	99	103	98	93
Rye	99	99	96	98	94
Oats	92	93	97	92	87
Production (1,000 metric tons)					
Corn	72	5,832	4,673	---	---
Barley	6,505	12,280	269	858	849
Rye	2,444	275	50	150	50
Oats	1,959	798	464	334	286
Weighted average price ($ per metric tons)					
Wheat	102	99	112	103	103
All coarse grain	97	99	103	97	92
Wheat/coarse grain price ratio	1.05	1.00	1.09	1.06	1.12
Weighted average prices for 1964/65 - 1966/67 ($ per metric ton)					
Wheat	106.63	82.55	110.24	102.24	95.93
All coarse grains	99.20	73.70	79.72	91.33	78.61
Wheat/coarse grain price ratio	1.07	1.12	1.38	1.12	1.22

1/ Price assumed to be the same as that calculated for France.

Source: Computed from data in: (14, 73, 78).

LIVESTOCK UNITS IN MEMBER COUNTRIES OF THE EUROPEAN ECONOMIC COMMUNITY



INDIVIDUAL YEARS PLOTTED THROUGH 1967 WITH PROJECTIONS TO 1975. *SOURCE: TABLE 17 AND STRAIGHT LINE EXTRAPOLATION.*

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Figure 3
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Table 23.--Livestock units in the EEC and individual member countries with projections to 1975

Country	1956/58	1965/67	1975	Percent increase 1956/58 to 1965/67	Percent increase 1965/67 to 1975
West Germany	14,431	15,923	17,400	10.3	9.3
France	22,107	23,328	25,600	5.5	9.7
Italy	11,144	11,984	13,200	7.5	10.1
Netherlands	3,389	4,267	5,200	25.9	21.9
Belgium-Lux.	2,688	2,995	3,400	11.4	13.5
EEC	53,759	58,497	64,800	8.8	10.8

Source: Partly computed and table 17.

units--was the estimation of cow numbers.[65/] The Sorenson and Hathaway study projected cow numbers at 27.9 million head in 1975, compared with 20.7 million head by IFO (table 24). The result is that the IFO study projected 7.2 million less cows and 9.2 million tons less milk in 1975 that did the Sorenson-Hathaway study. These differences were largely confined to France, Italy, and West Germany. Unlike the Sorenson-Hathaway study, the IFO study assumed that the EEC would act to curtail milk production increases.

Generally, the projection of pork and poultry production by Sorenson and Hathaway were at a higher level than the IFO study (table 24). If projections in both studies were convertible into livestock units, the result would be a vastly higher level of livestock units for the Sorenson and Hathaway study than for the IFO study.[66/]

A straight line extrapolation of livestock units resulted in the projections for 1975 that are shown in table 23. Comparison of the 1965/67 to 1975 period with the 1956/68 to 1965/67 period showed some decline in the rate of increase in livestock units expected in the Netherlands and West Germany, but a more rapid increase in France, Italy, and Belgium-Luxembourg. These projections appear to be more in line with the Sorenson and Hathaway study than with the IFO study.

65/ The IFO study specified "dairy cows" while the Sorenson-Hathaway study made no specification. However, the average milk yield shown in the Sorenson-Hathaway study, divided into total milk production, resulted in the number of cows listed. Actually, milk cows in the EEC were almost all dual purpose animals supplying beef and veal as well as milk. Carpenter identified France as the only country in Western Europe having any significant proportion of beef type animals in the national herd (7).

66/ The aggregate classes of livestock presented in these two studies did not permit use of the conversion coefficients listed in table 17.

Table 24.--Projections of cow numbers and selected livestock products to 1975, EEC and member countries

Country and study	Cows	Pork	Poultry		Beef and veal	Milk
			Meat	Eggs		
	1,000 head	1,000 tons				
EEC						
Sorenson-Hathaway	27,948.0	5,638.8	2,331.0	2,921.0	4,725.2	85,238.1
IFO	20,718.0	5,265.0	1,965.0	2,766.0	4,059.0	76,015.0
West Germany						
Sorenson-Hathaway	6,088.7	2,626.5	472.0	1,008.0	1,341.2	26,205.6
IFO	5,500.0	5,670.0	300.0	1,004.0	1,235.0	22,550.0
France						
Sorenson-Hathaway	13,695.0	1,550.0	855.0	750.0	2,135.0	34,607.3
IFO	9,000.0	1,300.0	706.0	722.0	1,767.0	31,050.0
Italy						
Sorenson-Hathaway	5,118.3	564.3	562.0	626.0	599.0	11,465.2
IFO	3,300.0	365.0	600.0	659.0	495.0	10,395.0
Netherlands						
Sorenson-Hathaway	1,930.0	598.0	282.0	336.0	400.0	8,415.0
IFO	1,800.0	640.0	233.0	211.0	324.0	7,650.0
Belgium-Luxembourg						
Sorenson-Hathaway	1,116.0	300.0	160.0	201.0	250.0	4,545.0
IFO	1,118.0	290.0	126.0	170.0	238.0	4,370.0

Source: (73, 38).

Trend

The use of time as a variable in the statistical analysis, as discussed earlier, was to represent various influences not otherwise specified in the demand for wheat for feed equations. These influences included growing knowledge and familiarily in using wheat for feed and Government policies. Measured in this manner, the empirical analysis failed to support the hypothesized relationship between wheat for feed use and these variables in all EEC countries except for Belgium-Luxembourg.

World Wheat Prices

The Economic Research Service of the U. S. Department of Agriculture has prepared intermediate (1973/74) and long-term (1980) projections on world grain production, consumption, and trade (89). In the 1973/74 projections for wheat, the analysis emphasized a continuation of the current international wheat situation--slowing growth in import demand and abundant supplies in major exporting countries. Downward pressures on prices were expected to continue as exporters competed keenly for commercial markets. Food aid requirements were expected to fall to lower levels. Prospects for 1980 were viewed with slightly less pessimism.

Simantov noted the grain surpluses of recent years in the group of countries with membership in the Organization for Economic Cooperation and Development (OECD)[67] and indicated that the near-term surplus situation could increase through further declines in food aid requirements and limits on the demand for grain for animal feeding (70). It was also pointed out by Simantov that the net grain export availability of the OECD plus Oceania--without any special stimulus to output, but simply on the basis of present policies--could rise from "20 million tons in 1961-63 (6 percent of production) to 90 million tons in 1975 (19 percent of production) and 121 million tons in 1985 (21 percent of production) (70, p. 8)." At the same time, traditional importing countries in Europe would become more self-sufficient in grains.

Large world supplies of wheat resulted in severe competition and exporter price cutting in 1969. Prices declined substantially below minimum levels set in the International Grains Arrangement--negotiated only a short time earlier as a part of the Kennedy Round. Efforts to raise prices to minimum levels agreed to under the IGA were futile and probably will continue to be futile until surplus supplies are dissipated.

The c.i.f. price of wheat in the United Kingdom fell to a level of 27.07 pounds ($64.97) per long ton in July 1969. As indicated in appendix table 13 the United Kingdom's wheat import price fell close to 25 pounds per long ton during the 1957/58 - 1960/61 period of large world wheat supplies. In view

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67/ Member countries of the OECD are Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

of: (1) recent price declines in world wheat markets and (2) projections of large grain supplies through 1980-1985 by the Economic Research Service, USDA, and the Organization for Economic Cooperation and Development, the "world" wheat price is projected at 27 pounds per long ton in 1975. In predevaluation terms, however, this converts to only slightly above 23 pounds per long ton.68/

Since large world wheat supplies are projected to continue through 1975, the Community might be further encouraged to promote increased home use of wheat for feed. This is especially true since a deficiency in feed grains is expected through 1975. Tangible evidence of plentiful supplies of soft wheat will probably result in less resistance to feeding wheat and greater experience on using wheat for feed will very likely begin to convince farmers of its high quality as a feed.

Demand for Wheat for Feed

The projected quantity of wheat used for feed in the whole of the EEC for 1975 was 9.7 million tons (data on selected earlier years also provided in table 25). France and West Germany were expected to continue as the major feed wheat consumers in the EEC accounting for 6.5 and 2.2 million tons, respectively. This represents a substantial advance in feed wheat consumption for both countries. Consumption of wheat for feed in Belgium-Luxembourg and Italy was projected to stay at a relatively low level but surpass the level attained in both countries between 1961/62 - 1966/67 (appendix table 3). The Netherlands use of wheat for feed was projected to increase sharply and reach 767,000 tons in 1975--60 percent above the previous high in 1961/62.

The sharply increased use of wheat for feed in the 1967/68, 1968/69, and 1969/70 marketing years suggests that the 9.7 million metric ton estimate for 1975 may be low (1966/67 was the last year of data used in the statistical analysis). Estimates compiled from various sources indicate that wheat used for feed in the EEC may have exceeded 6 million metric tons in 1967/68 and 8 million metric tons in 1968/69. This figure was probably around 9 million tons in 1969/70 since the EEC had unusually large carryover stocks of soft wheat and a good crop.69/ Stocks at the beginning of the 1970/71 marketing year are estimated to have been reduced to a normal level of 6 million tons with a preliminary crop estimate of 29.5 million tons. Over 4 million tons of wheat was denatured in the EEC in 1969/70.

Discounting of the French franc and easy credit terms made it profitable for West German traders in 1968/69 to realize a profit by purchasing grain in France and then turning the grain over to German intervention agencies. The result was that huge amounts of France's surplus wheat moved into West German storage and disposed of in part through denaturing for feed. Devaluation of the French franc and revaluation of the German mark alleviated, if not erased, this problem.

68/ In November 1967, the par value of the British pound was devalued from $2.80 to $2.40

69/ Stocks were estimated at 9.5 million tons on August 1, 1969, compared with 7.6 million tons a year earlier. The 1969/70 crop was 31.5 million tons (32.3 in 1968/69).

Table 25.--Quantity of wheat consumed by livestock in member countries of the EEC, 1955/56, 1960/61, 1965/66 and projections to 1975

Country	1955/56	1960/61	1965/66	1975
	1,000 metric tons			
West Germany	1,134	1,603	1,605	2,208.8
France	2,024	2,715	3,587	6,469.7
Italy	66	120	96	133.6
Netherlands	66	358	47	766.7
Belgium-Luxembourg	60	90	11	89.1
Total	3,350	4,886	5,346	9,667.9

Source: Partly calculated and appendix table 3.

Whether or not similar monetary situations will develop in the future is unknown. Lack of a common monetary policy certainly leaves the opportunity wide open for the future. Perhaps, even more important is the clear indication that much larger than usual quantities of wheat can be made to move into feed use. Not only has the denaturing of wheat expanded in West Germany, it has expanded in other member countries as well. In some cases, the denaturing premiums applied resulted in wheat/corn price relationships which were extremely favorable to wheat in terms of relative feeding values.

Vigen's projection of wheat used for feed in the EEC in 1975 was at a higher level than that projected in this report--10.8 and 11.2 million tons under different assumptions of low and high economic growth, respectively (83, p. 106). The higher projection for West Germany and Italy--2,741,000 and 874,000 tons, respectively,under high economic growth--accounted for most of the difference between Vigen's projection and the projection in this report. The amount of wheat moving into feed use was increasing at a more rapid pace during 1951-62 (the period of Vigen's analysis) than during 1955/56 - 1966/67, resulting in the projection of larger quantities.

IFO projected that wheat used for feed in West Germany would approximate 2.8 to 2.9 million tons in 1975 (39, p. 212). This projection for West Germany exceeded that of this report (2.2 million tons) as well as Vigen's estimate (2.5 - 2.7 million tons). CREDOC projected that French consumption of wheat for feed would total 5 million tons in 1975, substantially below the projection in this study (6.5 million tons) and Vigen's projection (6.6 - 6.9 million tons) (8, p. 311). The Agricultural Economics Research Institute assumed that wheat used for feed in the Netherlands would fall to zero by 1970 and remain nil through 1975 (1). On the other hand, Vigen estimated that 555,000 - 622,000 metric tons of wheat would move into feed use in the Netherlands in 1975, whereas the projection for this study was over 750,000 tons. Although use of wheat for feed in the Netherlands may not reach these higher level projections in 1975, it is unlikely that use will fall to zero. Approximately 300,000 tons of wheat moved into feed use in the Netherlands in 1968/69.

The use of 9.5 million tons of wheat as feed in the EEC in 1975 could be considered conservative, while 11 million tons would certainly be considered an upper limit. IFO estimated that wheat production in the EEC in 1975 would reach 32.7 million tons and that 11.4 million tons of this production would be available for feed or export (38, tables 6-19). The use of 11 million tons of soft wheat for feed is unlikely because the Community's exports of soft wheat will not fall to nil.

The amount of wheat going into feed use--particularly wheat fed directly on the farm--was undoubtedly calculated as a residual figure for the various countries. A tendency inherent in this process would be to push any estimation error in other uses into the feed use category.

Wheat which may be used for feed in the EEC in 1975 would displace feed grain imports. This is true because the Community will remain deficit in feed grains in 1975. The displacement would not necessarily be on a one-ton of wheat to one-ton feed grains ratio because of variations in the relative feeding values of grains by different classes of livestock. Assuming that substitution of 9.5-11 million tons of wheat for feed grains would be based solely on the relative feeding values developed by Kellner and Becker for hogs and dairy cattle, the feed grain import reduction could range from a low of 8.6 - 10.0 million tons to a high of 12.5 - 14.5 million tons (43).

Corn is the major feed grain imported by the Common Market. Thus, it is the grain most likely to be displaced by any increased use of wheat for feed. The quantity of corn displaced would be less than for other feed grains since its relative feeding value is closest to wheat. Substantial quantities of feed grain imports in 1968/69 were already being displaced by the 8 million tons of soft wheat consumed as feed in the Community. This amount of wheat was equivalent to 7.3 - 7.8 million tons of corn.

There was clearly no nutritional or biological reason preventing the movement of 9.5 - 11 million tons of wheat into feed use in the EEC throughout the year. This amount of feed would have accounted for 20-25 percent of the estimated 45 million tons of grain consumed for feed in 1969/70. Furthermore, the total amount of grains used for feed will be greater by 1975. Whether the EEC might encounter a logistics or transportation problem in getting the feed wheat to areas where it can be effectively utilized by the livestock industry is outside the scope of this study.

NEED FOR FURTHER RESEARCH

Further research and study are needed on the attitudes of the farmers, the feed manufacturers, and the feed nutritionists to the use of wheat for feed. These investigations should cover topics such as: (1) reasons for farmer reluctance to the use of wheat for feed; (2) technical problems, if any associated with use of a large proportion of wheat in a given unit of mixed feed, and (3) reasons some feed nutritionists advocate holding wheat in concentrates at very low levels.

Table 26.--Feed grains displaced by soft wheat fed to livestock, EEC, projections for 1975 1/

Grain	Hogs	Dairy cattle
	Million metric tons	
Wheat used for feed	9.5 - 11.0	9.5 - 11.0
Would replace the following amounts of		
Corn	9.2 - 10.7	8.6 - 10.0
or		
Barley	10.7 - 12.4	10.0 - 11.6
or		
Oats	11.9 - 13.8	12.5 - 14.5
or		
Sorghum	9.8 - 11.3	9.4 - 10.9

1/ Based on relative feeding values developed by Oskar Kellner and Max Becker (43).

Much additional information is needed on the livestock feeding practices of Community farmers. This includes more recent information on the amount of wheat fed to the various types of livestock as well as methods employed in feeding wheat to a particular class of livestock. At present, little is known about directional shifts or trends in the feeding methods and use of wheat by class of livestock.

A better understanding of the practical implementation and functioning of the Community's grain-denaturing program is imperative to improved forecasting of feed use of wheat. This is especially so if the wheat/feed grain price ratio continues to lack full adjustment to relative feeding values. Investigations would include the practical inconveniences to feed mixers inherent in the denaturing requirements and the locations in the EEC where the denaturing of wheat and the direct incorporation of wheat into mixed feeds occurs.

There is a need for better price information on grains despite the fact that recent computation of regional price data represents a major advance. There is still need for a well constructed series of producer prices, wholesale prices, and retail prices for the European Economic Community.

More detailed information and analysis are needed on the transportational and locational aspects associated with using wheat for feed. Since transportation rates in the EEC have not yet been harmonized, considerable rate variation exists between countries. In addition, rates vary within a single country depending upon the mode of transportation (barge, rail, truck), the length of haul, the type and weight of product, and so forth. Other studies indicated that these aspects of the transporation complex influenced the magnitude and type of agricultural production and the flow of agricultural trade. Further investigation is needed on the present and future proximity of surplus soft wheat areas to major livestock producing areas and the various price relationships (including the Community's price regionalization policies) and other forces which would tend to increase the use of wheat for feed.

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Appendix Table 1. Selected data on volume of U. S. grain exports, 1957/58-1968/69

Year (July/June)	Total grain exports 1/			Wheat exports (including wheat flour)			Feed grain exports 2/		
		As a percentage of U. S.			As a percentage of U. S.			As a percentage of U. S.	
	To the EEC	Total grain exports to the world	Total commercial grain exports to the world 3/	To the EEC	Total wheat and flour exports to the world	Total commercial flour and wheat exports to the world	To the EEC	Total feed grain exports to the world	Total commercial feed grains exports to the world 3/
	1,000 metric -tons-	--Percent---	---Percent---	1,000 metric -tons-	---Percent---	----Percent----	1,000 metric -tons-	--Percent---	---Percent---
1957/58	3,414	18	35	945	9	26	2,469	31	41
1958/59	5,373	24	46	1,067	9	32	4,306	41	52
1959/60	5,648	23	50	851	6	26	4,797	43	60
1957/58 1959/60 Average	4,812	22	44	954	8	28	3,857	38	51
1960/61	6,192	21	48	2,021	11	41	4,171	38	52
1961/62	7,357	22	45	1,840	9	33	5,517	39	51
1962/63	6,310	20	38	674	4	18	5,636	38	43
1963/64	6,719	17	29	1,474	6	16	5,245	34	37
1964/65	7,787	21	39	635	3	16	7,152	41	44
1965/66	11,944	24	38	1,766	8	22	10,178	40	44
1966/67	8,131	20	30	1,506	8	15	6,625	32	39
1967/68	9,039	23	37	1,320	6	17	7,719	40	47
1965/66 1967/68 Average	9,705	22	35	1,531	7	18	8,174	37	43
1968/69	6,511	23	30	1,316	9	17	5,495	35	37

1/ Excludes rice, rye, and all grain products except wheat flour.

2/ Includes barley, oats, corn, and grain-sorghum.

3/ Includes insignificant amounts of feed grain products and wheat products (in addition to wheat flour).

Source: Computed from: (13).
U. S. Department of Agriculture, Economic Research Service, U. S. Foreign Agricultural Trade by Commodities: Fiscal Year 1969, Washington; September 1969, p. 9.
_____, Foreign Agricultural Trade of the United States, Washington, September 1969, pp. 14, 15, and November 1969, p. 18).
U. S. Department of Commerce, Bureau of the Census, unpublished computer printout.

Appendix Table 2. Selected data on value of U. S. grain exports, 1957/58-1968/69

Year (July/June)	Total grain exports 1/			Wheat exports (including wheat flour)			Feed grain exports 2/		
	To the EEC	As a percentage of U. S.		To the EEC	As a percentage of U.S.		To the EEC	As a percentage of U. S.	
		Total agricultural exports to the EEC	Total agricultural commercial exports to the world		Total agricultural exports to the EEC	Total agricultural commercial exports to the world		Total agricultural exports to the EEC	Total agricultural commercial exports to the world
	--$1,000--	------Percent-----	---Percent--	--$1,000--	------Percent-----	---Percent--	---$1,000---	------Percent-----	---Percent---
1957/58	170,841	19	6	57,342	7	2	113,499	13	4
1958/59	289,317	37	12	74,248	9	3	215,069	27	9
1959/60	289,012	26	9	60,222	5	2	228,790	20	7
1957/58 1959/60 Average	249,723	27	9	63,937	7	2	185,786	20	7
1960/61	330,213	30	10	133,670	12	4	196,543	18	6
1961/62	403,188	34	12	131,598	11	4	271,590	23	8
1962/63	323,313	30	9	48,989	5	1	274,324	26	6
1963/64	377,095	28	8	98,934	7	2	278,161	21	6
1964/65	418,298	31	9	40,557	3	1	377,741	28	9
1965/66	643,439	40	13	105,423	7	2	538,016	34	11
1966/67	467,678	31	9	99,131	7	2	368,547	24	7
1967/68	479,547	34	10	87,854	6	2	391,693	28	8
1965/66 1967/68 Average	530,221	35	11	97,469	7	2	432,752	29	9
1968/69	354,941	27	8	86,001	7	2	268,940	21	6

1/ Excludes rice, rye, and all grain products except wheat flour.

2/ Includes barley, oats, corn, and grain sorghum.

Source: Computed from: U. S. Department of Agriculture, Economic Research Service, Foreign Agricultural Trade of the United States, Washington, July-August 1963, p. 40 April 1968, p. 40, April 1969, p. 5,
Eleanor N. DeBlois, "Increased Dollar Exports in Fiscal Year 1966/67 Bring U. S. Exports of Farm Products to Record Level for Fourth Consecutive Year," Foreign Agricultural Trade of the United States, Washington, U. S. Department of Agriculture, November 1967, pp. 5-23.
_____, Twelve Years of Achievement Under Public Law 480, Washington, U. S. Department of Agriculture, November 1967.
_____, "Smaller Commercial Sales, Due Partly to Lower Prices, Brought U. S. Agricultural Exports in Fiscal Year 1968 to Third Highest Level," Foreign Agricultural Trade of the United States, Washington, U. S. Department of Agriculture, November 1968, pp. 20-52, November 1969, pp. 29, 58.

Appendix Table 3. Supply and utilization of wheat in the EEC, 1955/56-1967/68

Item	1955/56	1956/57	1957/58	Average 1955/56-1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	Average 1965/66-1967/68
	Thousand metric tons														
EEC															
Production	24,328	18,730	24,559	22,539	24,316	25,814	24,137	23,060	29,495	24,445	29,158	30,369	26,309	31,207	29,295
Imports	5,426	7,220	4,821	5,882	4,782	4,208	6,580	6,736	3,849	4,810	4,281	5,183	4,970	4,976	5,043
From within the EEC	775	305	922	667	618	831	692	866	371	699	733	938	690	1,361	996
Outside EEC	4,651	6,915	3,899	5,155	4,164	3,377	5,888	5,870	3,478	4,011	3,548	4,245	4,280	3,615	4,047
Exports	3,198	1,525	4,074	2,932	2,735	3,117	2,491	3,189	4,157	4,493	6,402	6,776	5,169	4,278	6,074
Change in stocks	+750	+672	-844	+193	-258	-660	+1,079	-193	+1,814	-2,021	-554	+1,167	-1,308	+2,164	674
Total	25,806	23,753	26,150	25,236	26,621	27,565	27,129	26,800	27,373	26,784	27,591	27,609	27,418	27,741	27,589
Food	20,128	19,661	20,018	19,936	20,045	19,835	20,123	20,183	20,080	20,029	19,942	20,247	19,902	19,814	20,021
Feed	3,350	1,935	3,954	3,080	4,455	5,472	4,886	4,484	5,074	4,658	5,525	5,346	5,540	5,829	5,572
Used directly on farms	2,813	1,442	2,310	2,188	2,978	3,919	3,499	2,989	3,635	3,614	4,421	3,956	4,331	4,784	4,357
Through commercial markets	537	493	1,644	891	1,477	1,553	1,387	1,495	1,439	1,044	1,104	1,390	1,209	1,045	1,215
Seed	2,148	1,965	1,949	2,021	1,913	1,877	1,786	1,884	1,968	1,857	1,881	1,756	1,769	1,760	1,762
Industrial use	33	55	74	54	45	57	56	68	61	89	94	94	52	82	76
Loss	147	137	155	146	163	324	278	186	190	151	149	166	155	156	159
Total	25,806	23,753	26,150	25,236	26,621	27,565	27,129	26,800	27,373	26,784	27,591	27,609	27,418	27,741	27,589
West Germany															
Production	3,278	3,381	3,728	3,462	3,582	4,386	4,815	3,917	4,453	4,710	5,047	4,218	4,397	5,644	4,753
Imports	2,554	3,290	2,623	2,822	2,471	2,209	2,214	3,520	1,889	1,931	1,560	1,960	1,848	1,939	1,916
From within the EEC	618	137	587	447	309	490	499	556	240	273	192	356	329	673	453
Outside EEC	1,936	3,153	2,036	2,375	2,162	1,719	1,715	2,964	1,649	1,658	1,368	1,604	1,519	1,266	1,463
Exports	337	308	596	414	603	718	754	1,083	571	1,057	747	844	640	630	705
Change in stocks	-77	+829	-6	+248	-150	+98	+415	+282	+2	-298	+47	-454	-131	+711	42
Total	5,572	5,534	5,761	5,622	5,600	5,779	5,860	6,072	5,769	5,882	5,813	5,788	5,736	6,242	5,922
Food	4,156	4,108	4,056	4,107	3,975	3,946	3,940	3,876	3,820	3,771	3,794	3,833	3,726	3,707	3,755
Feed	1,134	1,142	1,385	1,220	1,329	1,517	1,603	1,835	1,620	1,755	1,663	1,605	1,704	2,191	1,833
Used directly on farms	932	897	986	938	932	1,202	1,207	1,155	1,094	1,337	1,445	1,177	1,539	1,834	1,517
Through commercial markets	202	245	399	282	397	315	396	680	526	418	218	428	165	357	317
Seed	225	207	222	218	227	236	237	272	241	245	242	236	240	248	241
Industrial use	18	39	60	39	32	43	42	52	52	75	78	77	31	60	56
Loss	39	38	38	38	37	37	38	37	36	36	36	37	35	36	36
Total	5,572	5,534	5,761	5,622	5,600	5,779	5,860	6,072	5,769	5,882	5,813	5,788	5,736	6,242	5,922

--Continued

Appendix Table 3. Supply and utilization of wheat in the EEC, 1955/56-1967/68 -- Continued

Item	1955/56	1956/57	1957/58	Average 1955/56-1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	Average 1965/66-1967/68
	Thousand metric tons														
France															
Production	10,388	5,687	11,108	9,061	9,628	11,544	11,014	9,573	14,053	10,249	13,838	14,760	11,297	14,287	13,448
Imports	777	1,749	399	975	676	425	513	444	684	817	728	774	714	493	660
From within the EEC	21	122	--	48	43	--	--	6	28	16	15	23	24	33	27
Outside EEC	756	1,627	399	927	633	425	513	438	656	801	713	751	690	460	634
Exports	2,583	417	2,379	1,793	1,030	1,748	1,557	1,817	3,083	2,756	4,698	4,844	3,130	4,309	4,094
Change in stocks	-448	-5	+200	-84	-138	+254	+474	-656	+1,561	-996	-252	+660	-954	+1,159	288
Total	9,030	7,024	8,928	8,327	9,412	9,967	9,496	8,856	10,093	9,306	10,120	10,030	9,835	9,312	9,726
Food	5,939	5,555	5,930	5,808	6,068	5,858	5,998	5,918	5,952	5,767	5,596	5,673	5,464	5,200	5,446
Feed	2,024	590	2,113	1,576	2,485	3,276	2,715	2,046	3,177	2,703	3,669	3,587	3,608	3,322	3,506
Used directly on farms	1,767	463	1,215	1,148	1,910	2,571	2,222	1,733	2,445	2,204	2,885	2,697	2,677	2,756	2,710
Through commercial markets	257	127	898	427	575	705	493	313	732	499	784	890	931	566	796
Seed	1,020	842	833	898	801	784	713	814	889	794	815	716	716	746	726
Industrial use	5	5	5	5	4	5	7	5	3	5	5	5	6	6	6
Loss	42	32	47	40	54	44	63	73	72	37	35	49	41	38	43
Total	9,030	7,024	8,928	8,327	9,412	9,967	9,496	8,856	10,093	9,306	10,120	10,030	9,835	9,312	9,726
Italy															
Production	9,504	8,684	8,478	8,889	9,815	8,471	6,794	8,301	9,497	8,127	8,586	9,776	9,400	9,596	9,591
Imports	698	746	280	575	70	86	2,445	955	354	635	751	1,057	1,011	946	1,005
From within the EEC	8	--	--	3	--	1	2	3	4	106	335	305	184	193	227
Outside EEC	690	746	280	572	70	85	2,443	952	350	529	416	752	827	753	777
Exports	143	747	1,027	639	954	452	97	159	235	267	326	493	842	299	545
Change in stocks	+1,317	-103	-1,044	+57	-48	-951	+140	+60	+475	-784	-351	+800	-40	+286	349
Total	8,742	8,786	8,775	8,768	8,979	9,056	9,002	9,037	9,141	9,279	9,362	9,540	9,609	9,957	9,702
Food	7,779	7,818	7,826	7,808	7,845	7,901	7,950	8,175	8,232	8,406	8,475	8,648	8,703	8,993	8,781
Feed	66	60	67	64	255	136	120	70	75	64	74	96	100	200	132
Used directly on farms	66	60	59	62	69	59	49	58	62	62	70	76	81	160	106
Through commercial markets	--	--	8	3	186	77	71	12	13	2	4	20	19	40	26
Seed	850	860	833	848	827	797	777	738	779	752	755	736	746	700	727
Industrial use	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Loss	47	48	49	48	52	222	155	54	55	57	58	60	60	64	61
Total	8,742	8,786	8,775	8,768	8,979	9,056	9,002	9,037	9,141	9,279	9,362	9,540	9,609	9,957	9,702

--Continued

Appendix Table 3. Supply and utilization of wheat in the EEC, 1955/56-1967/68 -- Continued

Item	1955/56	1956/57	1957/58	Average 1955/56-1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	Average 1965/66-1967/68
	Thousand metric tons														
Netherlands															
Production	350	309	393	351	402	514	608	482	603	537	737	704	602	757	688
Imports	910	922	1,062	965	1,059	1,063	906	1,310	541	823	789	811	838	1,021	890
From within the EEC	128	11	266	135	222	306	159	279	46	89	144	91	54	307	151
Outsida EEC	782	911	796	830	837	757	747	1,031	495	734	645	720	784	714	739
Exports	103	33	29	55	41	38	44	48	61	113	390	340	391	783	505
Change in stocks	-48	-29	+8	-23	+29	-6	+2	+129	-149	+49	-7	+86	-72	-51	-12
Total	1,205	1,227	1,418	1,283	1,391	1,545	1,468	1,617	1,232	1,198	1,143	1,089	1,121	1,046	1,085
Food	1,104	1,098	1,114	1,105	1,087	1,060	1,072	1,099	1,027	1,043	1,007	1,000	994	954	983
Feed	66	95	269	143	268	446	358	479	170	128	96	47	81	46	58
Used directly on farms	11	14	15	13	5	14	16	9	11	7	5	6	1	2	3
Through commercial markets	55	81	254	130	263	432	342	470	159	111	91	41	80	44	55
Seed	17	15	17	16	18	20	19	20	19	23	24	25	26	26	26
Industrial use	8	9	7	8	7	7	7	6	6	5	7	8	11	12	10
Loss	10	10	11	10	11	12	12	13	13	9	9	9	9	8	9
Total	1,205	1,227	1,418	1,283	1,391	1,545	1,468	1,617	1,232	1,198	1,143	1,089	1,121	1,046	1,085
Belgium-Luxambourg															
Production	808	669	852	776	889	899	906	787	889	822	950	911	613	923	816
Imports	487	513	457	486	506	425	502	505	381	604	453	581	559	577	572
From within the EEC	--	35	69	52 1/	44	34	32	22	53	215	47	163	99	155	139
Outside EEC	487	478	388	451	462	391	470	483	328	389	406	418	460	422	433
Exports	32	20	43	32	107	161	39	82	207	300	241	255	166	257	226
Change in stocks	+6	-20	-2	-5	+49	-55	+66	-8	-75	+8	+9	+75	-111	+59	8
Total	1,257	1,182	1,268	1,235	1,239	1,218	1,303	1,218	1,138	1,118	1,153	1,162	1,117	1,184	1,154
Food	1,150	1,082	1,092	1,108	1,070	1,070	1,163	1,115	1,049	1,042	1,070	1,093	1,015	1,060	1,056
Feed	60	48	120	76	118	97	90	54	32	18	23	11	47	70	43
Used directly on farms	37	8	35	27	62	73	5	34	23	4	16	--	33	32	32 1/
Through commercial markets	23	40	85	49	56	24	85	20	9	14	7	11	14	38	21
Seed	36	41	44	40	40	40	40	40	40	43	45	43	41	40	41
Industrial use	2	2	2	2	2	2	0	0	0	4	4	4	4	4	4
Loss	9	9	10	9	9	9	10	9	17	11	11	11	10	10	10
Total	1,257	1,182	1,268	1,235	1,239	1,218	1,303	1,218	1,138	1,118	1,153	1,162	1,117	1,184	1,154

1/ Two-year average only.

Note: Data may not add to totals dua to rounding.

Source: Statistical Offica of the European Communities, Agricultural Statistics, Brussela, No. 1, 1968, and No. 2, 1969.

Appendix Table 4.--Coefficients used to adjust imported wheat to the EEC's "standard quality" 1/

Country and type of wheat	Quality coefficients	
	Effective March 7, 1969	Effective prior to March 7, 1969
	$ per metric ton	
United States		
Red Winter I and II	3.75	3.75
Red Winter Garlicky II and III	2.50	2.50
Western White II	3.75	3.75
Soft White II	3.75	3.75
Hard Winter and Dark Hard Winter I and II:		
Protein content up to 12.4% with or without protein guarantee	9.00	9.00
Protein content of 12.5 to 12.9% guaranteed	9.75 2/	9.00
Protein content of 13.0 to 13.4% guaranteed	10.50 2/	9.00
Protein content of 13.5 to 13.9% guaranteed	11.25 2/	9.00
Protein content of 14.0% or more guaranteed	12.00	12.00
Northern Spring I and II	10.50	10.50
Red Spring I and II	10.50	10.50
Dark Northern Spring III	10.50	10.50
Dark Northern Spring I and II	12.00	12.00
Canada		
Manitoba I	12.50	12.50
Manitoba II	12.00	12.00
Manitoba III	10.50	10.50
Manitoba IV	9.00	9.00
Canada V	6.00	6.00
Argentina		
Southern Wheat (Bohia, Blanca, Necochea)	9.00	9.00
Up River (Rosa Fee)	9.00	9.00
Down River (Buenos Aires)	9.00	9.00
Australia		
FAQ	5.75	5.75
Western	6.75 2/	5.75
Semi-Hard II	9.00	9.00
South Hard	9.00 2/	----
Prime Hard (13% protein guaranteed)	10.50 2/	----
Great Britain		
English Milling	0	0
Sweden	0	0
Bulgaria	2.25	2.25
Romania	3.75 2/	----
USSR		
Type 441	9.00 2/	----
Type 431	10.50 2/	9.00
Type 121 (SKS 14) 14% protein guaranteed	12.50 2/	----

1/ The quality coefficients are subtracted from the c.i.f. prices of wheat to determine which price is lowest for purposes of setting the import levy.

2/ Quality coefficients which were changed or became newly effective on March 7, 1969.

Source: European Communities, Journal Official des Communautes Europeennes, Brussels, various issues, June 27, 1967; February 23, 1968; March 4, 1969.

Appendix Table 5. Wheat used for feed by species of livestock, EEC and member countries, 1955/56-1964/65

Area and species of livestock	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65
	Thousand metric tons									
EEC 1/	3,350	1,935	3,954	4,455	5,472	4,886	4,484	5,074	4,658	5,516
Cattle	N/A	N/A	N/A	476	571	537	445	498	482	568
Hogs	N/A	N/A	N/A	794	994	965	967	901	971	1,060
Poultry	N/A	N/A	N/A	2,431	2,982	2,599	2,491	2,848	2,512	2,950
Other animals	N/A	N/A	N/A	636	828	695	527	795	675	915
West Germany	1,134	1,142	1,385	1,329	1,517	1,603	1,835	1,620	1,755	1,663
Cattle	59	84	106	87	101	144	131	139	199	184
Hogs	324	254	404	390	463	552	606	547	664	668
Poultry	751	698	875	852	953	907	1,098	934	892	811
Other animals	---	6	---	---	---	---	---	---	---	---
France 2/	2,024	590	2,113	2,485	3,276	2,715	2,046	3,177	2,703	3,660
Cattle	202	59	211	248	328	271	205	318	270	365
Hogs	203	59	212	249	327	272	204	317	271	367
Poultry	1,113	325	1,162	1,367	1,802	1,493	1,125	1,747	1,487	2,013
Other animals	506	147	528	621	819	679	512	795	675	915
Italy	66	60	67	225	136	120	70	75	64	74
Cattle	N/A	N/A	N/A	122	66	58	---	---	---	---
Hogs	N/A	N/A	N/A	56	30	26	---	---	---	---
Poultry	N/A	N/A	N/A	67	35	31	70	75	64	74
Other animals	N/A	N/A	N/A	10	5	5	---	---	---	---
Netherlands	66	95	269	268	446	358	479	170	118	96
Cattle	N/A	2	32	19	76	64	109	41	13	19
Hogs	N/A	32	110	99	174	115	157	37	36	25
Poultry	N/A	61	122	145	192	168	198	92	69	52
Other animals	N/A	---	5	5	4	11	15	---	---	---

1/ Belgium-Luxembourg included in total but not in subgroupings.

2/ Data estimated.

Source: Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 9, 1967.

N/A = Not available.

Appendix Table 6.--Types of grain fed to selected species of livestock, EEC, 1/ 1958/59-1964/65

Species of livestock and year	Total 2/	Wheat	Rye	Barley	Oats	Corn	Other grains 2/
	1,000 metric tons						
All livestock							
1958/59	27,454	4,337	2,440	6,693	6,678	6,530	776
1959/60	30,492	5,375	2,750	6,989	6,723	7,634	1,021
1960/61	31,018	4,796	2,981	6,564	6,842	8,782	1,053
1961/62	32,186	4,430	2,521	7,706	6,956	9,611	962
1962/63	33,323	5,042	2,501	7,879	7,222	9,624	1,055
1963/64	36,252	4,640	2,446	7,637	7,298	12,773	1,458
1964/65	36,477	5,493	2,643	7,974	6,808	12,079	1,480
Cattle							
1958/59	5,497	476	505	2,031	1,662	721	102
1959/60	6,280	571	632	2,167	1,815	922	173
1960/61	6,491	537	740	2,188	1,844	1,023	159
1961/62	6,589	445	522	2,561	1,803	1,129	129
1962/63	7,171	498	601	2,745	1,962	1,202	163
1963/64	7,694	482	662	2,708	2,036	1,586	220
1964/65	7,629	568	667	2,789	1,962	1,415	228
Hogs							
1958/59	9,875	794	1,557	3,902	1,630	1,647	345
1959/60	10,868	994	1,723	4,152	1,640	1,910	449
1960/61	10,770	965	1,850	3,637	1,769	2,088	461
1961/62	11,791	967	1,693	4,328	1,837	2,555	411
1962/63	11,763	901	1,612	4,369	1,957	2,527	397
1963/64	12,615	971	1,522	4,191	1,933	3,409	589
1964/65	13,184	1,060	1,654	4,551	2,013	3,265	641
Poultry							
1958/59	8,543	2,431	321	631	947	3,891	322
1959/60	9,661	2,982	340	537	884	4,525	393
1960/61	10,150	2,599	338	629	894	5,279	411
1961/62	10,514	2,491	262	704	1,047	5,604	406
1962/63	11,061	2,848	256	679	1,084	5,705	489
1963/64	12,436	2,512	233	649	1,038	7,412	592
1964/65	12,438	2,950	291	555	944	7,114	584
Other animals							
1958/59	3,539	636	57	129	2,439	271	7
1959/60	3,683	828	55	133	2,384	277	6
1960/61	3,607	695	53	110	2,335	392	22
1961/62	3,292	527	44	113	2,269	323	16
1962/63	3,328	795	32	86	2,219	190	6
1963/64	3,507	675	29	89	2,291	366	57
1964/65	3,226	915	31	79	1,889	285	27

1/ Excludes Belgium-Luxembourg.

2/ Excludes rice.

Source: Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 9, 1967, pp. 18-31.

Appendix Table 7. Wheat as a proportion of grain 1/ used for feed, by species of livestock for West Germany, France, Italy, and Netherlands, 1958/59-1964/65

Species of livestock and year	West Germany			France 2/			Italy			Netherlands		
	Total	Wheat	Wheat as a percentage of total	Total	Wheat	Wheat as a percentage of total	Total	Wheat	Wheat as a percentage of total	Total	Wheat	Wheat as a percentage of total
	1,000 metric tons		Percent	1,000 metric tons		Percent	1,000 metric tons		Percent	1,000 metric tons		Percent
Cattle												
1958/59	1,442	87	6.0	2,417	248	10.3	981	122	12.4	657	19	2.9
1959/60	1,795	101	5.6	2,623	328	12.5	1,069	66	6.2	793	76	9.6
1960/61	1,899	144	7.6	2,530	271	10.7	1,250	58	4.6	812	64	7.9
1961/62	1,771	131	7.4	2,843	205	7.2	1,151	---	---	824	109	13.2
1962/63	1,989	139	7.0	2,842	318	11.2	1,342	---	---	993	41	4.1
1963/64	2,155	199	9.2	2,883	270	9.4	1,570	---	---	1,086	13	1.2
1964/65	2,272	184	8.1	2,980	365	12.2	1,478	---	---	899	19	2.1
Hogs												
1958/59	4,781	390	8.2	2,346	249	10.6	1,413	56	4.0	1,335	99	7.4
1959/60	5,358	463	8.6	2,525	327	13.0	1,483	30	2.0	1,502	174	11.6
1960/61	5,109	552	10.8	2,464	272	11.0	1,605	26	1.6	1,592	115	7.2
1961/62	5,555	606	10.9	2,806	204	7.3	1,955	---	---	1,475	157	10.6
1962/63	5,632	547	9.7	2,802	317	11.3	2,171	---	---	1,158	37	3.2
1963/64	5,607	664	11.8	2,952	271	9.2	2,714	---	---	1,342	36	2.7
1964/65	6,201	668	10.8	3,065	367	12.0	2,589	---	---	1,329	25	1.9
Poultry												
1958/59	1,945	852	43.8	3,150	1,367	43.4	2,185	67	3.1	1,263	145	11.5
1959/60	2,149	953	44.3	3,487	1,802	51.7	2,772	35	1.3	1,253	192	15.3
1960/61	2,109	907	43.0	3,679	1,493	40.6	2,908	31	1.1	1,454	168	11.6
1961/62	2,613	1,098	42.0	3,489	1,125	32.2	3,050	70	2.3	1,362	198	14.5
1962/63	2,513	934	37.2	3,836	1,747	45.5	3,331	75	2.3	1,381	92	6.7
1963/64	2,662	892	33.5	4,425	1,487	33.6	4,153	64	1.5	1,196	69	5.8
1964/65	2,867	811	28.3	4,359	2,013	46.2	3,933	74	1.9	1,279	52	4.1
Other animals												
1958/59	640	---	---	2,277	621	27.3	475	10	2.1	147	5	3.4
1959/60	521	---	---	2,544	819	32.2	478	5	1.0	140	4	2.9
1960/61	437	---	---	2,469	679	27.5	463	5	1.1	238	11	4.6
1961/62	322	---	---	2,327	512	22.0	402	--	---	241	15	6.2
1962/63	238	---	---	2,502	795	31.8	456	--	---	132	---	---
1963/64	206	---	---	2,582	675	26.1	457	--	---	262	---	---
1964/65	145	---	---	2,517	915	36.4	367	--	---	197	---	---

1/ Excludes rice.

2/ Data estimated.

Source: Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 9, 1967, pp. 32-58

Appendix Table 8. West Germany: Selected "quality" factors for wheat and computation of an aggregate "quality" scale, 1/ 1955/56-1968/69

Year	Moisture		Weight		Other factors					Aggregate scale
					Foreign grain	Various imputities	Sprouted grains	Total	Scale	
	Percent	Scale	Kilograms per Hectoliter	Scale	Percent	Percent	Percent	Percent	Percent	
1955/56	N/A	---	N/A	---	N/A	N/A	N/A	N/A	---	---
1956/57	N/A	---	N/A	---	N/A	N/A	N/A	N/A	---	---
1957/58	17.5	3	74.8	3	2.0	0.3	2.6	4.9	4	10
1958/59	17.9	3	74.2	3	5.4	0.7	1.9	8.0	2	8
1959/60	16.0	5	74.2	3	1.9	0.3	1.1	3.3	5	13
1960/61	19.8	1	73.0	1	4.7	0.7	4.9	10.3	1	3
1061/62	18.7	2	73.6	2	5.3	0.9	0.7	6.9	3	7
1962/63	18.5	2	76.4	5	3.1	0.7	0.3	4.1	4	11
1963/64	19.6	1	74.8	3	3.0	0.7	3.4	7.1	2	6
1964/65	16.1	4	77.6	5	2.4	0.4	0.2	3.0	5	14
1965/66	20.6	1	73.7	2	4.4	1.5	1.4	7.3	2	5
1966/67	17.2	3	73.8	2	6.1	1.0	0.4	7.5	2	7
1967/68	17.2	3	76.2	5	4.6	0.6	0.3	5.5	4	12
1968/69	18.6	2	73.9	2	3.6	0.6	2.9	7.1	1	5

1/ The data are for winter wheat alone which normally accounts for 88 percent of West Germany's total wheat production.

Source: Partly calculated and data supplied in communication from the Federal Research Institute for Grain Processing, Detmold, Germany, to Mr. George A. Parks, U.S. Agricultural Attache, Bonn, April 14, 1969.

Appendix Table 9. Selected observations of French wheat harvesting conditions and quality of crop, 1956-68

Year	Harvest conditions	Degree of moisture	Proportion of germinated grains	Specific weight (kilograms per hectoliter)	Other observations
1956	Rains, improvement in September, difficult harvest	High (20 percent)	---	76	Some losses through germination and molds.
1957	Rainy and cool	---	Low	70 (Southwest) to 80 Average: 75-76	The rains caused losses of yield and lowered the quality of the grain.
1958	Quite variable, very late crop, poor harvest conditions	High	Germinated grains	Frequently low	Lowering of yield, root rot.
1959	Hot and dry summer, favorable conditions	Dry grain	---	High	Good quality.
1960	Rainy summer, difficult harvest conditions	Moist grain	---	Moderate	Mediocre quality due to moisture.
1961	Favorable, good conditions	Dry grain	---	Good: 76.5-78	Average yields.
1962	Hot and dry summer, good conditions	Dry grain	---	High	Very good yields.
1963	Rainy summer, late crop	Coarse grain (20 percent)	10 percent or more	Low and irregular	Eyespot, mold, one part of the harvest classified as feed.
1964	Hot and dry summer, favorable conditions	Low	---	Average	Good harvest
1965	Cold and moist, late and difficult harvest	High	High	Low	Many portions of feed wheat
1966	Dry August, harvest difficult at outset, terminated under good conditions	Little moist grain	Germinated grains in Central and Western France	Less than the norm (North and Northwest). Satisfactory elsewhere	Wheatmidge
1967	Hot and stormy summer, good harvest conditions	Fairly low	---	75-80, 78 kilograms on the average	Good quality
1968	Rains, difficult harvest	Sometimes 20 percent	2-3 percent	72-74	Root rot and wheatmidge.

Source: Data supplied by letter to Mr. Thomas E. Street, U. S. Agricultural Attache, Paris by Mr. Jean-Pierre Andrault, Association Generale des Producteurs de Ble et Autres Cereales, Paris.

Appendix Table 10. Production of coarse grain in EEC member countries, 1955/56-1966/67

Item	1955/56	1956/57	1957/58	Average 1955/56-1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	Average 1964/65-1966/67
	Thousand metric tons													
West Germany														
Oats 1/	3,243	3,316	3,032	3,197	2,953	2,852	3,177	2,877	3,610	3,444	3,476	3,027	3,366	3,290
Barley	2,017	2,241	2,429	2,229	2,342	2,757	3,124	2,640	3,632	3,454	3,798	3,264	3,753	3,605
Corn	20	20	16	19	13	13	20	23	42	47	61	93	123	92
Rye 2/	3,551	3,781	3,875	3,736	3,800	3,965	3,927	2,582	3,033	3,315	3,671	2,868	2,741	3,093
Other cereals	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total	8,831	9,358	9,352	9,180	9,108	9,587	10,248	8,122	10,317	10,260	11,006	9,252	9,983	10,080
France														
Oats	3,668	4,642	2,603	3,638	2,663	2,815	2,735	2,591	2,628	2,876	2,310	2,509	2,578	2,466
Barley	2,678	6,429	3,635	4,247	3,901	4,931	5,716	5,413	6,003	7,384	6,791	7,378	7,421	7,197
Corn 3/	1,091	1,738	1,392	1,407	1,673	1,825	2,813	2,470	1,864	3,871	2,105	3,420	4,340	3,288
Rye 2/	496	538	542	525	493	504	447	370	375	373	411	409	378	399
Other cereals	217	314	210	247	247	226	242	242	249	483	469	517	628	538
Total	8,150	13,661	8,382	10,064	8,977	10,301	11,953	11,086	11,119	14,987	12,086	14,233	15,345	13,888
Italy														
Oats	523	507	582	537	568	451	431	585	597	548	466	527	477	490
Barley	292	276	296	288	296	279	232	279	285	280	252	285	253	263
Corn	3,204	3,410	3,496	3,370	3,670	3,879	3,813	3,936	3,263	3,692	3,950	3,317	3,510	3,592
Rye	123	105	92	107	105	105	93	96	93	77	86	83	83	84
Other cereals	(30) 4/	(30)	(30)	30	30	36	41	37	35	37	38	34	35	36
Total	4,172	4,328	4,496	4,332	4,669	4,840	4,610	4,933	4,273	4,634	4,792	4,246	4,358	4,465
Netherlands														
Oats 1/	677	585	615	626	582	413	522	593	632	570	546	452	418	472
Barley	264	273	292	276	315	268	291	385	431	387	376	373	416	388
Corn	23	9	6	13	4	1	1	1	0	0	0	0	0	0
Rye	465	492	458	472	428	386	460	301	339	313	356	250	190	265
Other cereals	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total	1,429	1,359	1,371	1,386	1,329	1,068	1,274	1,280	1,402	1,270	1,278	1,075	1,024	1,126
Belgium-Luxembourg														
Oats 1/	531	547	506	528	497	486	517	514	496	463	431	396	356	394
Barley	297	309	312	306	334	416	402	428	522	504	535	550	523	536
Corn	8	7	4	6	3	2	2	2	3	2	2	2	3	2
Rye 2/	231	209	201	214	213	187	200	130	129	136	144	110	83	112
Other cereals	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total	1,067	1,072	1,023	1,054	1,047	1,091	1,121	1,074	1,150	1,105	1,112	1,031	965	1,036

1/ Includes summer mixed grains.

2/ Includes winter mixed grains.

3/ October 1 to September 30.

4/ Data in parenthesis are estimates.

Note: Data may not add to totals due to rounding.

Source: Statistical Office of the European Communities, Agricultural Statistics, Brussels, No. 1, 1968.

Appendix Table 11. Prices received by farmers for selected grains, EEC member countries, 1955/56-1966/67 1/

Item	1955/56	1956/57	1957/58	Average 2/ 1955/56-1957/58	1958/59	1959/60	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	Average 2/ 1964/65-1966/67
	$ per metric ton													
West Germany														
Soft wheat	98.57	95.71	99.76	98.01	100.24	100.95	96.90	104.25	105.50	105.38	107.00	105.38	107.50	106.63
Rye	92.86	89.76	94.05	92.22	92.14	91.67	86.19	93.75	97.25	96.50	97.38	96.50	96.50	96.79
Barley	100.48	100.00	100.48	100.32	101.19	100.24	101.90	107.00	105.98	104.58	106.58	106.30	105.68	106.19
Oats	81.19	79.76	80.00	80.32	83.33	83.81	80.48	86.25	90.75	89.83	94.10	94.63	92.60	93.78
France														
Soft wheat	91.91	108.29	70.01	90.07	68.46	74.54	76.58	80.82	85.23	84.91	79.52	81.02	87.10	82.55
Rye	69.94	78.26	62.33	70.18	56.17	57.89	60.77	60.16	71.30	72.59	66.52	72.23	75.98	71.58
Barley	N/A	71.31	61.52	66.42 5/	57.08	63.54	62.79	64.61	69.88	66.84	66.62	70.26	76.83	71.24
Oats	N/A	56.00	56.33	56.16 5/	57.87	59.33	56.51	60.56	73.53	51.85	61.17	71.38	65.00	65.85
Corn	102.86	102.23	86.83	97.31	79.64	77.84	72.01	73.32	83.35	80.57	87.24	85.58	83.17	85.33
Italy														
Soft wheat	111.38	110.27	111.18	110.94	101.25	103.26	108.75	105.68	109.22	111.86	110.78	111.04	108.90	110.24
Rye	87.36	91.39	85.74	88.16	81.34	79.26	83.26	82.48	99.04	101.70	97.65	99.84	98.66	98.72
Barley	90.53	88.83	70.82	83.39	73.47	78.58	79.28	73.86	80.27	78.53	85.12	86.24	85.98	85.78
Oats	90.34	79.70	62.69	77.58	65.52	76.72	78.05	63.36	75.34	78.83	81.04	83.36	82.40	82.27
Corn	82.69	77.92	69.01	76.54	69.41	67.10	66.62	67.74	75.18	77.30	81.28	75.20	78.43	78.30
Netherlands														
Soft wheat	66.50	69.16	72.89	69.52	76.03	79.97	80.61	83.18	85.58	92.46	102.04	102.76	101.93	102.24
Rye 3/	65.66	65.66	70.26	67.19	67.11	79.61	68.89	86.19	83.67	85.30	88.59	95.64	98.31	94.18
Barley 3/	64.74	64.87	69.21	66.27	68.82	78.29	70.45	80.25	78.87	80.80	86.91	94.01	90.08	90.33
Oats 3/	61.05	65.89	71.32	66.09	69.89	85.53	68.92	81.77	82.82	79.64	89.50	92.38	92.02	91.30
Belgium-Luxembourg 4/														
Soft wheat	89.20	94.00	93.40	92.20	93.20	93.80	91.00	92.00	92.00	92.80	97.20	91.00	99.60	95.93
Rye	54.40	64.20	58.00	58.87	69.00	72.00	60.40	81.40	73.00	71.40	73.60	77.20	81.60	77.47
Barley	63.20	65.20	59.80	62.73	78.60	75.60	68.00	85.80	79.60	78.80	80.20	82.20	82.80	81.73
Oats	59.20	60.20	54.00	57.80	69.00	77.20	64.60	68.80	72.40	68.80	72.80	76.40	75.80	75.00

1/ In general, the prices have been obtained by dividing the value of all sales by the quantity sold without regard to quality.

2/ Unweighted averages.

3/ Starting with the 1955 harvest, data included the subsidy granted for barley, oats, and rye cultivated on sandy soils and peat bogs.

4/ Belgium only.

5/ 1956/57 and 1957/58.

Source: European Communities, Prix Recus par les Producteurs Agricoles -- Marches Agricoles, Brussels, May 1968.

Appendix Table 12.--France: Wheat denaturing premiums and quantity of wheat denatured or directly incorporated into feed, 1955/56-1966/67

Year	Subsidy 1/	Quantity of wheat denatured		
		Total	Dyeing	Directly incorporated into feed
	- $ per metric ton -	- - - - - - - - - - - - 1,000 metric tons - - - - - - - - -
1955/56	33.00 2/	N/A	N/A	N/A
1956/57	37.00 2/ 3/ 4/	N/A	N/A	N/A
1957/58	31.00 2/	890	828 10/	62
1958/59	30.00 2/ 5/	547	365	182
1959/60	23.00 2/ 5/	711	487	224
1960/61	20.00 2/ 3/ 5/	480	270 10/	210
1961/62	17.00 2/ 5/ 6/	311	221	90
1962/63	24.00	716	474	242
1963/64	19.00 7/	492	302	190
1964/65	23.00 7/	777	378	399
1965/66	24.00 7/ 8/	878	403	475
1966/67	21.00 9/	921	442	479

1/ Conversion 1 NF = 0.20255 U.S. dollars

2/ Calculated as the difference between what Farnsworth and Friedmann specify as the "wholesale price-general" and the "wholesale price-special feed." This procedure may have resulted in some over estimation of the denaturing premium since the "wholesale price-general" refers to grain of standard quality while "wholesale price-special feed" may be grain of a lower quality.

3/ Based on the maximum legal price at which denatured wheat might be sold for feed by the trading agencies. Processors of mixed feeds could generally buy denatured wheat on similar terms.

4/ The "wholesale price-special feed" for 1956/57 was applicable only to small quantities of wheat showing signs of deterioration because of high moisture or other reasons.

5/ This difference is calculated from prices which include seasonal increments.

6/ This difference is calculated from prices which refer to 1960 crop wheat. During 1961/62 the subsidized wheat could only be purchased by processors of mixed feed for chickens.

7/ Computed on the assumption that denaturing was evenly distributed over the year. The subsidy was 10.42 NF per 100 kilograms in 1963/64, except for October 11 to April 17 when it was 8.17 NF; in 1964/65 it was 11.25 NF from July 1 to February 21, and 12 NF thereafter; in 1965/66 it was 12.00 NF from July 1 to April 21 and 11.00 NF thereafter.

8/ The initial subsidy of 12 NF was effective for Grades I and II (specific weight 74 and 73 kilograms per hectoliter with maximum impurities 4 and 6 percent, respectively),the eligible grades closest to, but still below "standard quality." A 10.50 NF subsidy was available for Grades IV (70 kilo specific weight with maximum impurities of 12 percent), for intermediate Grade III the subsidy was 11.50 NF. Each of these subsidies was reduced by 1.00 NF effective April 22.

9/ The initial subsidy of 11.00 NF was effective for Grades I and II; a 9.50 NF subsidy was available for Grades IV and 10.50 NF for Grades III. Each of these subsidies was reduced by 0.86 NF effective January 1.

10/ Includes 436,000 tons in 1957/58 and 23,700 tons in 1960/61 sold at exceptionally reduced prices to farmers for their farm use.

Source: Data on denaturing premiums are from (14). Data on quantity of wheat denatured supplied by letter to Mr. Thomas E. Street, U.S. Agricultural Attache, Paris, by Mr. Dauphin, O.N.I.C.

Appendix Table 13.--Selected trade data on U.K. wheat imports, 1955/56-1967/68

Time period	Total wheat imports			Wheat imports from France			Imports of denatured wheat		
	Quantity	Value	Price/Ton	Quantity	Value	Price/Ton	Quantity	Value	Price/Ton
	1,000 long -tons-	1,000 British -pounds-	British -pounds-	1,000 long -tons-	1,000 British -pounds-	British -pounds-	1,000 long -tons-	1,000 British -pounds-	British -pounds-
1955/56									
July-December 1955	2,141,813	58,638	-----	329,038	7,481	-----	-----	-----	-----
January-June 1956	2,561,948	70,945	-----	184,257	4,491	-----	-----	-----	-----
Total	4,703,761	129,583	27.54	513,295	11,972	23.32	-----	-----	-----
1956/57									
July-December 1956	2,233,108	64,942	-----	3	3	-----	-----	-----	-----
January-June 1957	2,214,733	64,703	-----	16,859	364	-----	-----	-----	-----
Total	4,447,841	129,645	29.14	16,862	367	21.76	-----	-----	-----
1957/58									
July-December 1957	2,316,580	59,129	-----	310,872	6,246	-----	-----	-----	-----
January-June 1958	2,245,263	56,177	-----	404,718	8,724	-----	-----	-----	-----
Total	4,561,843	115,306	25.27	715,590	14,970	20.91	-----	-----	-----
1958/59									
July-December 1958	2,276,081	57,734	-----	116,692	2,528	-----	-----	-----	-----
January-June 1959	2,384,288	60,416	-----	933	23	-----	-----	-----	-----
Total	4,660,369	118,150	25.35	117,625	2,551	21.68	-----	-----	-----
1959/60									
July-December 1959	1,894,002	48,064	-----	49,797	1,151	-----	-----	-----	-----
January-June 1960	2,000,327	51,455	-----	59,813	1,385	-----	-----	-----	-----
Total	3,894,329	99,519	25.55	109,610	2,536	23.13	-----	-----	-----
1960/61									
July-December 1960	2,107,446	53,282	-----	33,133	737	-----	-----	-----	-----
January-June 1961	2,002,302	51,309	-----	51,788	1,114	-----	-----	-----	-----
Total	4,109,748	104,591	25.44	84,921	1,851	21.79	-----	-----	-----
1961/62									
July-December 1961	1,927,179	49,840	-----	44,441	926	-----	-----	-----	-----
January-June 1962	2,135,651	56,393	-----	119,756	2,906	-----	-----	-----	-----
Total	4,062,830	106,233	26.14	164,197	3,832	23.33	-----	-----	-----
1962/63									
July-December 1962	1,791,237	47,736	-----	42,284	1,018	-----	-----	-----	-----
January-June 1963	1,939,163	50,867	-----	69,213	1,533	-----	-----	-----	-----
Total	3,730,400	98,603	26.43	111,497	2,551	22.87	-----	-----	-----
1963/64									
July-December 1963	2,001,244	52,726	-----	188,682	4,186	-----	-----	-----	-----
January-June 1964	2,096,460	56,610	-----	331,327	7,323	-----	-----	-----	-----
Total	4,097,704	109,336	26.68	520,009	11,509	23.13	-----	-----	-----
1964/65									
July-December 1964	1,688,592	46,532	-----	143,849	3,084	-----	-----	-----	-----
January-June 1965	2,077,036	55,266	-----	101,085	2,400	-----	-----	-----	-----
Total	3,765,628	101,798	27.03	244,934	5,484	22.38	-----	-----	-----
1965/66									
July-December 1965	2,262,931	59,206	-----	198,440	4,459	-----	-----	-----	-----
January-June 1966	2,044,614	54,442	-----	149,829	3,465	-----	157,855	3,490	-----
Total	4,307,545	113,648	26.38	348,269	7,924	22.75	157,855	3,490	22.11
1966/67									
July-December 1966	1,961,574	53,457	-----	48,375	1,132	-----	109,236	2,376	-----
January-June 1967	1,940,472	53,814	-----	49,464	1,214	-----	2,737	66	-----
Total	3,902,046	107,271	27.49	97,839	2,346	23.98	111,973	2,442	21.80
1967/68									
July-December 1967	1,833,066	50,756	-----	120,798	2,774	-----	114,637	2,522	-----
January-June 1968	2,063,156	59,555	-----	178,338	4,215	-----	79,659	1,820	-----
Total	3,896,222	110,311	28.31	299,136	6,989	23.36	194,296	4,342	22.35

Source: Her Majesty's Stationery Office, Overseas Trade Accounts of the United Kingdom, London, 1966 to 1968.
Her Majesty's Stationery Office, Accounts Relating to Trade and Navigation of the United Kingdom, London, 1955 to 1964.

Appendix Table 14. Wheat, barley, corn and rye prices in EEC member countries, 1/ 1960, 1964, and projections to 1970 and 1975

Country	1960 2/	1964 3/	1970	1975 Low	1975 High	1960 3/	1964 3/	1970	1975 Low	1975 High
	$ per metric ton					$ per metric ton				
			Wheat					Barley		
West Germany	103.68	106.58	96.96	96.96	112.38	93.49	95.56	89.06	89.06	103.22
France	77.39	85.84	94.14	94.14	109.11	63.11	71.75	89.52	98.52	103.76
Italy	106.68	112.03	106.25	106.25	123.14	76.02	80.77	86.94	86.94	97.27
Netherlands	83.91	95.55	98.13	98.13	113.73	69.61	76.38	88.53	88.53	102.61
Belgium	93.60	95.74	97.67	97.67	113.20	72.85	78.00	84.08	84.08	97.45
	$ per metric ton					$ per metric ton				
			Corn					Rye		
West Germany	-----	-----	-----	-----	-----	94.36	97.16	89.67	89.67	103.92
France	74.59	77.49	91.47	91.47	106.01	59.87	66.04	89.68	89.68	103.94
Italy	66.21	78.18	87.44	87.44	97.79	80.19	98.41	86.94	86.94	97.27
Netherlands	-----	-----	-----	-----	-----	61.47	71.60	89.00	89.00	101.37
Belgium	-----	-----	-----	-----	-----	69.53	73.43	85.45	85.45	99.04

1/ Excluding Luxembourg.

2/ Average of 1959, 1960, and 1961 prices.

3/ Average of 1963 and 1964 prices.

Source: Data are calculated or taken directly from Donald J. Epp, (14).

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